Physical Characteristics, Chemical Composition, Organoleptic Test And The Number Of Microbes In The Biscuits With Addition Of Flour Banana Peels

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Abstract. The purpose of this study to analyze the physical characteristics, chemical composition and organoleptic test of biscuit flour with the addition of flour banana peel. Materials used are banana peels Kepok. Kepok banana peel has been found to contain high fiber food. Biscuit-making stage includes the formation of cream, adding flour and wheat flour dietary fiber from banana peels to concentrations of 0% as control, 25%, 50% and 75% of 100 grams of wheat flour; mixing; molding; baking in the oven for 20-25 minutes with a temperature of 180°C. Parameters to be measured, namely the physical characteristics include: hardness, softness, consistency, crispness. Furthermore, the biscuits were tested by chemical analysis (proximate). Organoleptic test include: aroma, taste, mouthfeel, aftertaste. Data were analyzed statistically using SAS computing programs. Physical and organoleptic test results biscuits with the addition of flour banana peels has sufficient level of preference between like-liked. Based on the results of the proximate analysis of biscuits with the addition of flour banana peels has generally been in accordance with the National Standards of Indonesia (SNI). Conclusion of the study that the addition of flour banana peels in biscuits has the potential to become functional foods that contain high fiber.

1. Introduction
At this time Indonesia is in full swing to build towards a developed and prosperous country. The most important resource for the course of development is human resources. In this case the man not only as objects of development, but as subjects important role in the development process. However, this time there has been a shift or change in lifestyle, which causes mortality and morbidity in the community increased, characterized by changing patterns of infectious diseases become degenerative and metabolic diseases. Therefore, maintaining health is very important. Health is one of the major factors that support each person can carry out the processes of life, such as to grow and develop, and carry out all the activities of life are socially and economically productive.

Various ways can be done in order to obtain optimal health status, one of them with a set menu of food with added fiber foods. Dietary fiber consists of total dietary fiber, which includes soluble dietary fiber and insoluble dietary fiber [1]. Fiber is not soluble in water consisting of cellulose, hemicellulose, and lignin, which can be found in bran, cereal, nuts, vegetables and fruits; whereas is water-soluble pectin, agar-agar, carrageenan, musilase, and gum [2][3]. Dietary fiber derived from plants can be used as functional materials [4] [5], because the fiber can interact physiologically to provide many benefits to support the setting in digestion, hyperlipidemia and hypercholesterolemia disease, can be prevented by improving diet high in dietary fiber.
Dietary fiber can provide physiological effects, such as (i) an increase in gastrointestinal health; (ii) improved glucose tolerance and insulin response; (iii) reduction in the risk of cancer; and (iv) setting and the digestion of fat and body weight [6]. Type, source, and amount of fiber affect bowel function in a different way. In general, the fiber that is resistant to fermentation in the colon such as wheat bran, largely increasing the volume of intestinal contents [8], thus helping to facilitate the stools. One source that can be used as a dietary fiber that is a banana peels.

Indonesia is one of the centers of origin of various types of bananas. It is therefore not surprising that in Indonesia the number of types of bananas are quite abundant. bananas are commonly cultivated today are the descendants of Moses acuminta Colla and Musa balbisiana Colla which has a lot of diversity in Thailand, Malaysia, Indonesia and Papua New Guinea [9]. However, these plants typically grouped into seedless banana or banana cultivation and wild bananas have seeds [10].

Peels bananas is part of the agricultural waste which is generally discarded as trash or used as animal feed. This has an impact on the increase of solid waste dumped into the environment. One effort is utilizing banana peels overcome by means of shaping it into nutritious food such as biscuits and certainly healthy. Results of previous studies show that the flour banana peels is a functional food ingredient containing high fiber [11]. Biscuits with the addition of flour banana peels is a product that needs to be developed and the potential to meet their food needs. Based on the above studies have been conducted to examine the physical characteristics, chemical composition, and organoleptic test in the biscuit with the addition of a banana peels.

2. Experimental Method

Materials used are Kepok banana peels. Kepok banana peels dried in the oven [11]. Once dried banana peels smoothed by using a blender. Phase manufacture of biscuits includes the formation of cream (creaming method), adding flour and dietary fiber flour banana peels with a concentration of 0% (not added flour banana peels as a control), 25%, 50% and 75% of 100 grams of wheat flour, mixing (mixing), printing, roasting in the oven for 30 minutes at a temperature of 150°C.

Parameters to be measured, namely the physical characteristics include: hardness, softness, consistency and crispness. Furthermore, the biscuits were tested by chemical analysis (proximate) which aims to see the magnitude of the nutritional value content, especially the content of dietary fiber of biscuit products are added to flour banana peels. In addition it aims also to see the trend change that occurred with the increasing flour banana peels are added. Organoleptic test include: flacour, color, mouthfeel, aftertaste.

Physical and organoleptic test conducted by test hedonic scale 1-4 (1 = less liked, 2 = quite likes, 3=likes, 4=love). Number of panelists to test the cake flour banana peels as many as 48 people. Parameters that have been observed to be analyzed using a statistical test by using analysis of variance (ANOVA) followed by Duncan's Multiple Range Test test [12]. The overall analysis performed with SAS software with SAS software 9.1.3.

3. Result and Discussion

Physical testing (texture) conducted on biscuits with the addition of flour banana peels of 0%, 25%, 50%, 75% gave results that were not significantly different in terms of hardness, softness, consistency and crispness at the 95% confidence level ($\alpha = 5\%$). Panelists passions levels of the physical condition of biscuits with the addition of flour banana peels were on a scale from 1.98 to 3.13 (less like- like) of four scale used. It shows that the formulation does not affect the general acceptance of the biscuit formulation with the addition of flour banana peels. Biscuit flour formulation with the addition of banana peels can be used because it has the same level of acceptance. Panelists passions levels Against Physical Appearance Flour Biscuits With the addition of Flour Banana Peels can be seen in Table 1.

Table 1: Panelists passions levels Against Physical Appearance Flour Biscuits With the addition of Flour Banana Peels

| Biscuit Type | Panelists Passions |
|--------------|--------------------|
| Control      | 2.50               |
| 25%          | 2.80               |
| 50%          | 2.75               |
| 75%          | 2.90               |

Texture is an important aspect of the quality of food, sometimes more important than the taste, flavor and color. Texture most important influence food quality soft and crunchy. Characteristic textures are most often referred to is the hardness, cohesiveness and water content. The fiber content
on a banana peels does not affect the hardness of the biscuits. That is because prior treatment mashed banana peels first. Biscuits produced tend not hollow (solid) but easily broken.

Table 1. Panelist passion levels against physical appearance flour biscuits with the addition of banana peels

| Biscuit Code | Hardness | Softness | Consistency | Crispness |
|--------------|----------|----------|-------------|-----------|
| KP0%         | 2.94     | 2.91     | 3.10        | 3.10      |
| KP25%        | 2.67     | 2.35     | 3.02        | 2.94      |
| KP50%        | 2.50     | 2.71     | 2.92        | 2.87      |
| KP75%        | 1.98     | 3.02     | 2.71        | 2.83      |

Annotation: Skala 1= less likely; 2= enough like, 3= like, 4= really like

Some materials used in the manufacture of biscuits with the addition of flour banana peels, among others, wheat, eggs, sugar flour, margarine and butter, skim milk. These materials are used to produce biscuits with the taste, texture and consistency were good. The addition of egg yolk in the manufacture of biscuits with the addition of flour banana peels produce biscuits with a soft texture. The use of egg yolks will produce a more tender biscuit than using whole eggs [13]. This is due to lecithin in egg yolk has emulsifying power. The presence of emulsifier makes eggs can improve the texture, increase the volume and increase the protein content. The role of the functional properties of the protein in the egg depends on the type of product to be made. Functional properties of proteins in eggs play a role determining the quality of the final product in the food industry [14].

In the manufacture of biscuit with the addition flour banana peels is used the sugar for generate taste and structure biscuit who good. Sugar in the manufacture biscuit serves to give a sense a sweet, softens and smoothes the texture as well as the make the colors crust biscuit become brown attractive [15]. In addition it, added also milk skim. Milk is functioning hold back absorption of water and for increase the value the nutritional of the product biscuit. The addition of milk skim can provide a sense, flavor, appearance the final product, regulate the density of dough, dissolving and propagate dough [13]. The addition of milk skim generate consistency of biscuit flour banana peels good enough.

The addition of flour banana peels does not affect the level of crispness biscuit produced. The level of crispness biscuit determined by the type of flour used, the higher the protein content of the flour, biscuits produced less crisp. This is because the high protein flour has a high gluten content. Conversely, the use of flour with a low protein content will produce a crunchy biscuit. This is in accordance with the opinion [16] that the flour is good for the manufacture of biscuits are wheat flour which has a low protein.

Biscuits with the addition of a banana peels flour 0%, 25%, 50%, and 75% effect on water, ash, protein, crude fiber, crude fat, carbohydrates, gross energy, and minerals can be seen in Table 2. Proximate test results showed that the biscuits with the addition of flour banana peels has a good nutrient content in accordance with the Indonesian National Standard (SNI 01-2973-1992) [17]. Water content values obtained from the biscuit with the code KP0% (1.96%), KP25% (1.51%), KP50% (1.31%), and KP75% (1.08%). The percentage of water content of biscuits with the addition of a banana peels flour is not more than 5% so in accordance with the Indonesian National Standard (01-2973-1992) biscuit is a maximum of 5%. Biscuit with a water content below 5% is expected to maintain the shelf life of biscuits, because the water content of less than 5% will be free of damage and of harmful microbes. Microbes will easily grow on media containing moisture or high water. The water content in food will determine acceptance, freshness and durability of the food. In the roasting process biscuit, a process of heating and the reduction of water content. The water content in the biscuits will affect consumer acceptance, especially on the attributes of texture (crispness). Biscuits with high water content tends not crisp so that the texture is less desirable and have short storage durability.
flour biscuits protein levels can meet the standard and suitable for consumption. The results showed that with the addition of banana peels flour contains low protein. The addition of protein from eggs, margarine and skim milk does not significantly raise the level of proteins. This is due to banana peels as much as 75%, namely biscuits protein content flour biscuits with the addition of banana peels as much as 75% higher than the required standards. Height biscuits can be caused by the materials used such as butter, margarine, milk powder is quite high in fat. In addition, such materials, high levels of fat content of flour biscuits with the addition of flour banana peels because the kepok banana due also used to have a fairly high fat content 14.63 (oven dry) and 15.29 (dry drying) [18]. The high fiber content of flour biscuits with the addition of the potential banana peels to become functional foods. This biscuit is expected to be a food that can lower blood cholesterol levels in patients with hypercholesterolemia or can maintain the balance of lipid levels and blood sugar levels.

Fiber content of flour biscuits with the addition of a banana peels is higher than the Indonesian National Standard maximum of 0.5%. Fiber content biscuits with the addition of flour banana peels 25%, 50%, 75% respectively was 1.92%, 2.47% and 3.13%. Along with the addition of flour biscuits banana peels made a little hard, rough and crumbly consistency. This is presumably because the influence of the fiber content of flour banana peels. Biscuit made seemed a little harsh, rough, crumbly consistency, and less crisp. This is presumably because the influence of the fiber content of flour banana peels is high. Kepok the banana peels in the oven containing 14.04% crude fiber and dry drying of 16.14% [11]. The high fiber content of flour biscuits with the addition of the potential banana peels to become functional foods. This biscuit is expected to be a food that can lower blood cholesterol levels in patients with hypercholesterolemia or can maintain the balance of lipid levels and blood sugar levels.

According to the Indonesian National Standard (01-2973-1992) fat content of the biscuit is a minimum of 9.5%. The fat content of biscuits with the addition of flour banana peels 25%, 50%, and 75% higher than the required standards. Height biscuits can be caused by the materials used such as butter, margarine, milk powder is quite high in fat. In addition, such materials, high levels of fat content of flour biscuits with the addition of flour banana peels because the kepok banana due also used to have a fairly high fat content 14.63 (oven dry) and 15.29 (dry drying) [18]. The high fiber content of flour biscuits with the addition of the potential banana peels to become functional foods. This biscuit is

| Parameters                | SNI | KP0% | KP25% | KP50% | KP75% |
|---------------------------|-----|------|-------|-------|-------|
| Water (%)                 |     | 1.96 | 1.51  | 1.31  | 1.08  |
| Ash (%)                   |     | 0.11 | 0.55  | 2.39  | 3.06  |
| Protein (%)               | Min | 0.33 | 0.05  | 0.00  | 0.21  |
| Crude Fiber (%)           |     | 2.83 | 1.92  | 2.47  | 3.13  |
| Crude Fat (%)             | Min | 14.85| 20.70 | 17.83 | 17.73 |
| Carbohydrates (%)         |     | 72.88| 66.57 | 68.31 | 68.08 |
| Gross Energy (Kkal/kg)    |     | 4196 | 4596  | 4342  | 4451  |
| Calcium (Ca) (%)          |     | 0.13 | 0.24  | 0.31  | 0.29  |
| Phosphorus (P) (%)        |     | 0.02 | 0.049 | 0.19  | 0.16  |

Annotation: KP0% = biscuit were not added flour banana peels; KP25%= biscuits were added flour banana peels amount 25%; KP50%= biscuit were added flour banana peels amount 50% KP75%= biscuit were added flour banana peels amount 75%

Results obtained proximate to the ash content biscuit code KP0% (1.11%), KP 25% (1.55%), KP50% (2.39%), and KP75% (3.06%). According to the Indonesian National Standard (01-2973-1992) ash content of the biscuit is a maximum of 1.5%. Biscuits with the addition of flour banana peels as much as 25%, 50%, 75% have ash content exceeds provision made SNI (1992). It can be explained that the mineral content found in flour banana peels is high enough so that the test results also high ash content. High levels of ash in biscuits allegedly because of biological minerals in a banana peels. The ash content is mineral elements as the residue left after the material was burnt to free the element carbon. The ash content can also be interpreted as a non-volatile components, remained in combustion and annealed organic compounds. The ash content of a food indicates residual inorganic material that remains after the organic material in the food broken. The ash content is not always equivalent to mineral material, because there are some minerals lost during volatilization or interactions between constituents.

The protein content flour biscuits with the addition of a banana peels is in conformity with the provisions of the Indonesian National Standard (01-2973-1992) at least 9%. It can be seen in 50% and 75%, namely biscuits protein content flour biscuits with the addition of a banana peels as much as 50% at 9.00% and the addition of flour banana peels as much as 75% of 9.21. This is due to banana peels flour contains low protein. The addition of protein from eggs, margarine and skim milk does not significantly raise the level of proteins. The results showed that with the addition of a banana peels flour biscuits protein levels can meet the standard and suitable for consumption.

Table 2. Proximate result of biscuits were added flour banana peels
expected to be a food that can lower blood cholesterol levels in patients with hypercholesterolemia or can maintain the balance of lipid levels and blood sugar levels.

Many carbohydrates contained in foodstuffs in the form of starch, sugar and crude fiber. According to the Indonesian National Standard (01-2973-1992) carbohydrate content in biscuits is at least 70%. Based on the amount of carbohydrates, biscuits with the addition of a banana peels starch still under SNI, this was due to the fat content of biscuits with the addition of a banana peels flour is quite high. The higher the fat content of biscuits contain a lower carbohydrate content. The low carbohydrate content allegedly due to reduction of wheat flour is replaced with flour banana peels low in protein and carbohydrates.

According to the Indonesian National Standard (01-2973-1992) biscuits calorie value is at least 400 Kal in 100g of material. Overall biscuit made without flour banana peels and floue banana peels with the addition of caloric value meets the requirements of SNI. that is a biscuit KP0% (4196 Kcal/kg), biscuits KP25% (4596 Kcal/kg), and biscuits KP50% (4342 Kcal/kg) and biscuits KP75% (4451 Kcal/ kg). High levels of energy on a biscuit base material is due to banana peels kapok have high energy levels, as well as several other ingredients such as flour, sugar and skim milk powder. The higher the addition of flour banana peels higher energy levels produced biscuits. High levels of energy biscuits with the addition of a banana peels flour showed that the biscuits produced has good nutritional value and can be used as an energy source.

Testing organoleptic conducted on biscuit with addition of flour banana peels with a composition 0%, 25%, 50%, 75% gave results that were not significantly different in terms of flavor, color, mouthfeel, and aftertaste at the 95% confidence level (α = 5%) (Table 3). Scores were obtained for flavor ranged from 2.71 to 3.21 (enough like-like), the color ranges from 2.19 to 3.27 (enough like- like), mouthfeel ranged from 2.23 to 3.08 (enough like-like), aftertaste ranging from 2.23 to 2.77 (enough like). A panelist level of the physical condition of biscuits with the addition of flour banana peels can be seen in the Table 3.

| Biscuit Code | Flavor | Color | Mouthfeel | Aftertaste |
|--------------|--------|-------|-----------|------------|
| KP0%         | 3.21   | 3.27  | 3.08      | 2.77       |
| KP25%        | 2.85   | 2.56  | 2.63      | 2.46       |
| KP50%        | 2.71   | 2.31  | 2.23      | 2.42       |
| KP75%        | 2.79   | 2.19  | 2.25      | 2.23       |

Annotation : Skala 1= less likely; 2= enough like, 3= like, 4= really like

In addition to protein, fat is one of the important components in the manufacture of biscuits because it serves as an aroma enhancer and produce products that crunchy texture. In the manufacture of biscuits with the addition of a banana peels flour also added oils, margarine and metega. The use of margarine in the manufacture of biscuits are based on the characterisctic plastically. The characterisctic of plasticity is important in producing a crunchy biscuit [13]. Biscuits with the addition of flour banana peels has a low protein content and high fat, so that the resulting products fairly crisp pastry. The panelists judged that the level of crispness of biscuits with the addition of flour banana peels is favored.

Flavors of food can be judged based on the smell, taste, and oral stimulation. Organoleptic test results in terms of aroma, color, mouthfeel and aftertaste flour biscuits with the addition of flour banana peels was not significantly different at the 95% confidence level (α = 5%). A panelist on the second level of biscuit products include enough like to like (2.19 to 3.27). This result is quite good because the flavor is an important factor in determining the quality of a food ingredient [18]. The addition of flour banana peels still give a distinctive flavor, so most panelists still feel the particularities flavor of banana peels. Flavor associated with the sense of smell. Oven or warming process allegedly able to increase the Maillard reaction, which is important as a source of flavor [19].

Similarly, the taste when chewed (mouthfeel) and after ingestion (aftertaste) flour biscuits with the addition of flour banana peels still feels a little bitter. One of the compounds that are suspected as the cause bitter or bitter taste in biscuits with the addition of flour banana peels is tannin. The presence of...
Tannins in foodstuffs are expected to cause a bitter taste in biscuits with the addition of flour banana peels. Allegedly excessive bitter taste associated with lipid and protein breakdown process. Oxidation phosphatidylcholine, amino acids, and peptides known to cause a bitter taste [19].

Biscuit brown color caused by the addition of banana flour brown. The brown color is due to the phytochemical compounds owned banana peels. In addition, the wet heating process will enhance the yellow color component and lower white [20].

4. Conclusion
Physical and organoleptic test results biscuits with the addition of flour banana peels has sufficient level of preference between like-liked. Based on the results of the proximate analysis of biscuits with the addition of flour banana peels has generally been in accordance with the National Standards of Indonesia (SNI 01-2973-1992). Based on proximate test fiber content of flour biscuits with the addition of flour banana peels potential as functional foods for health.

5. References
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