

Theme: Potential of Kepok Banana Fruit (*Musa Paradisiaca*) as a Halal Flavoring Ingredients In Yogurt Fermented Products

POTENTIAL OF KEPOK BANANA FRUIT (*MUSA PARADISIACA*) AS A HALAL FLAVORING INGREDIENTS IN YOGURT FERMENTED PRODUCTS

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ABSTRACT

Yogurt is a product of fermented milk with the help of lactic acid bacteria. The characteristics of yogurt, such as its sour taste and thick texture, make some people dislike it. There is a need to diversify the production of yogurt products that are not too sour by stopping the fermentation time at the desired acidity level and a texture that is not too thick to provide added value to yogurt production. Banana fruit extract contains Sugar, which is thought to stimulate the growth and increase the activity of lactic acid bacteria (LAB), so it can be used as a halal additional ingredient (flavor) in yogurt because the process of making the flavor is by following per under the halal product process. This research aims to determine the effect of adding kepok banana fruit extract as a flavoring to yogurt on nutrition after the fermentation process to form yogurt from cow's milk. The nutritional content tested in this study was protein, fat, and carbohydrates (reduced sugar content). The treatment applied was the effect of adding 0% (T0), 15% (T1), 30% (T2), and 45% (T3) banana fruit extract. Based on research results, data was obtained that adding Kepok banana extract can increase the amount of protein content by 0.05 – 1.30% in yogurt and has the potential to increase the amount of carbohydrates, reduce the degree of acidity, and reduce the fat content. The fat content in yogurt with banana extract is 2.57 – 2.75%.

Keywords: *Kepok Banana Fruit, Nutritional Content, Yogurt*

1. Introduction

Yogurt is a milk fermentation product with the help of lactic acid bacteria (LAB) (Santoso, 2014). Yogurt has many benefits for the body, including regulating the digestive tract, anti-diarrhea, anti-cancer, increasing growth, helping people with lactose intolerance, and regulating blood glucose levels. Yogurt's characteristics, such as its sour taste and thick texture, make some people dislike it. There is a need for diversification in making yogurt, namely by making yogurt products that are not too acidic by stopping the fermentation time at the desired acidity level and a texture that is not too thick, to provide added value to yogurt production.

Based on the Decree of the Minister of Religion of the Republic of Indonesia Number 464 of 2020 about Types of Products that must be halal certified, including fermented yogurt products and their flavors, the types of yogurt products include milk products and their analogs, with classification code 1.6.6 (Menteri Agama, 2020). Therefore, it is necessary to think about natural ingredients that have the potential to be used as food additives (flavors) in yogurt products. Apart from providing or

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adding flavor, flavors are also used to provide aroma or odor to food products or drinks. One of the flavorings that can be used is kepok banana fruit (*Musa paradisiaca*). The potential for banana production in Indonesia has a wide distribution area for bananas planted in yards and fields. Banana production in Indonesia, especially in North Sumatra, is ranked third highest, 164.533 in the North Sumatra province, after oranges in first place and pineapple in second place (BPS, 2022).

Banana fruit extract contains Sugar, which is thought to stimulate growth and increase LAB activity in producing lactic acid, thus affecting pH, because besides being higher in carbohydrates, bananas also contain vitamins C, B, B6, minerals (K, P, and Ca), β -carotene, thiamine, riboflavin, and calories; so that it can enrich the taste of yogurt and increase the nutritional value of yogurt. Carbohydrates in bananas are medium-level complex and are available gradually so that they can provide energy in a short time.

Previous research has shown that mango fruit extract containing Sugar can stimulate growth and increase LAB activity in the yogurt fermentation (Hidayat et al., 2013). The addition of 1% mango extract has the best quality. The banana's sugar/carbohydrate content is also quite large compared to manga and other fruits. Bananas contain complete sugars, namely glucose, sucrose, fructose, and vitamin C. The calorie content of bananas is around 90 calories; this value is high for the fruit category. One type of banana found in Indonesia is the Kepok banana fruit, a banana whose production is abundant and easy to find. There are two types of Kepok bananas: yellow Kepok bananas and white Kepok bananas. Yellow kepok banana is a type that has properties and benefits that are very important for human health. Both have the same nutritional content, but the taste is different. The vitamin C level in kepok bananas is 30.88 mg\100 g (Nazudin & Sabban, 2020). Yellow kepok bananas have a sweeter taste than white kepok bananas. Yellow kepok bananas are often processed, not served to be eaten straight away. This is because the taste will be sweeter after processing. The thick extract of the yellow kepok banana plant, including roots, tubers, leaf midribs, banana blossoms, and fruit, has the potential as an antibacterial against the test bacteria *Staphylococcus aureus* and *Escherichia coli* (Ningsih & Agustien, 2013).

In this study, Kepok banana fruits were chosen, which had previously been steamed first. Kepok bananas are a type of processed banana because they taste sweeter after processing. This type of Kepok banana was chosen as material in the research because Kepok banana fruits are produced abundantly and are easy to find economically. The price is lower than other types of bananas such as "Barangan," "Raja," and other types of bananas; kepok banana fruits are also often found in the North Sumatra area where the research was conducted.

The nutritional composition of Kepok banana fruits (Figure 1) can contain relatively high energy compared to other fruits. Bananas are rich in minerals, potassium, magnesium, iron, phosphorus, and calcium. Bananas also contain other nutrients, including vitamins B, B6, and C, and serotonin, an active neurotransmitter for smooth brain function, because bananas have nutritional content that meets the requirements to be used as a food ingredient suitable and safe for consumption.

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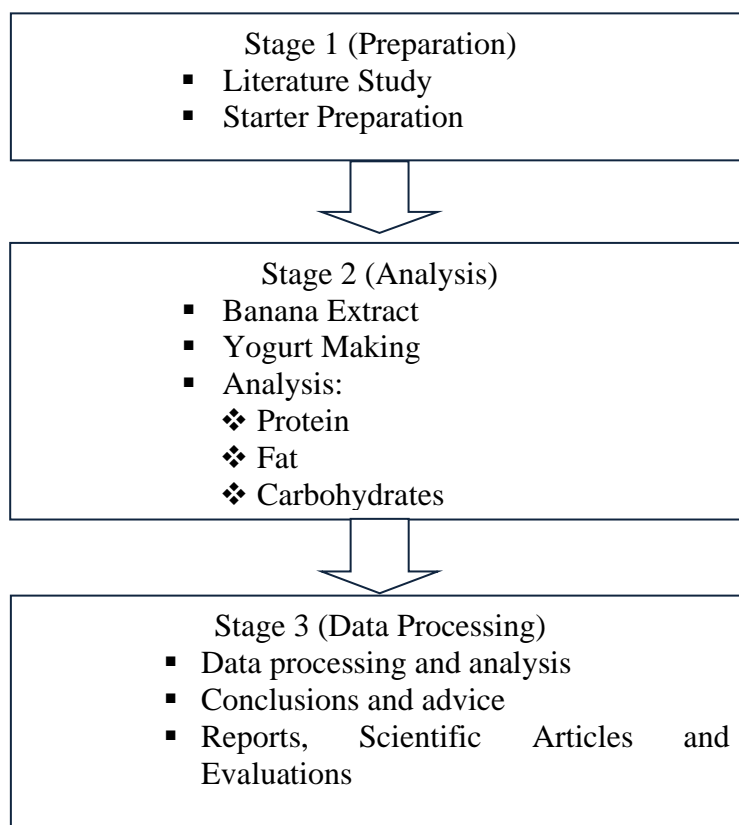
Figure 1. Kepok Banana Fruit (*Musa paradisiaca*)

2. Methods

This research was carried out in several laboratories in Medan, such as the Agricultural Laboratory, Universitas Pembangunan Panca Budi, Medan, Food Technology Laboratory, Microbiology Laboratory, Universitas Sumatera Utara, Medan.

Research Stages

In general, this research is divided into three main stages that will be carried out. These are the preparation, analysis, and data processing stages (Figure 2).



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Making Yogurt

Yogurt seeds usually consist of two bacteria, *Lactobacillus bulgaricus* and *Streptococcus thermophilus*, which live symbiotically. Since the seeds were planted in milk, there was a growth race between the two microbes; *Streptococcus thermophilus* grew faster, so its growth far exceeded *Lactobacillus bulgaricus*. This lasted up to a ratio of 3:1.

At this stage, the amount of lactic acid produced is large, so it can inhibit the growth of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* from overgrowing because they grow in relatively high acid conditions. Finally, microbial growth reaches a balance with a ratio of 1:1. According to Lee and Luce (2006), yogurt is powdered milk (15% w/v) plus granulated Sugar and pasteurized at 90°C for 15 minutes, then cooled to a temperature of 40 - 43°C. Then, the starter is inoculated using *Streptococcus thermophilus* and *Lactobacillus bulgaricus* with a ratio of 1:1, carried out aseptically at 2.5% (v/v), and then mixed until homogeneous. Milk inoculated with a starter is then incubated for 15 hours at 37 °C.

Banana Extraction

The Banana fruit extract is made by weighing 500 grams of kepok banana flesh, steaming the banana, then mashing it with mortar, after filtering it with double mori cloth. The filtered results are put into a centrifuge tube for 15 minutes. The resulting filtrate

Protein, Fat, and Carbohydrate Analysis

Analysis of protein, fat, and carbohydrates in samples was carried out using the AOAC method (Thiex, 2009)

4. Results and Discussion

The results of the analysis of the content of yogurt due to the addition of kepok banana fruit as a halal flavoring can be seen in Table 1.

Table 1. Analysis of Yogurt Protein, Fat and Reduced Sugar content

Sample	Protein (%)	Fat (%)	Reducing Sugar (%)
Control	9.10 ^a	3.12 ^d	11.70 ^b
15 %	9.15 ^b	2.57 ^b	-
30 %	10.40 ^d	2.40 ^a	11.96 ^c
45 %	10.21 ^c	2.75 ^c	12.40 ^d

Protein Content

Yogurt is a fermented milk product with the help of lactic acid bacteria (LAB) as a starter. The fermentation results of LAB bacteria convert milk sugar into lactic acid. However, only some people like the sour taste of yogurt, so breakthroughs are needed in making yogurt so that quality and sensory assessment improve. One of the developments in yogurt products is to produce yogurt that is less acidic, not too runny, easy to drink, and tastes fruity. Adding banana extract to yogurt is expected to improve the quality of the yogurt. Based on the research results shown in Table 4.1, it was found that the addition of banana extract can increase the amount of protein content by 0.05 – 1.30% in yogurt. Yogurt with the addition of banana extract contains 9.15 – 10.40% protein. The highest protein content in the sample with the addition of 30% banana extract was 10.40%. This protein content is above the minimum requirement for yogurt protein content in the Indonesian National Standard (SNI) 01-2981-1992. Following under SNI, yogurt contains a minimum protein content of 3.5%. It shows that yogurt with by adding banana extract can meet Indonesian national standards for making yogurt. The high protein content can help determine the hardness of the yogurt texture. This is in accordance with the statement that the hardness of food ingredients is determined by the water content of the ingredients, protein, and the amount of carbohydrates that make up the ingredients.

Fat Content

Based on the research results (Table 1), adding banana extract can reduce the fat content. This is because bananas have a higher carbohydrate content than fat content. The fat content in yogurt with banana extract is 2.57 – 2.75%. The fat content was lower than the control yogurt sample (without adding banana extract) at 3.12%. However, the fat content in yogurt with the addition of banana extract does not meet the minimum fat content according to SNI (minimum 3.8 %) (SNI 01-2981-1992). This occurs because low-fat milk is used in making yogurt, so the fat content produced in the control yogurt is also low (3.12 %). Dairy products are essential because they can contain high nutrients and be used as additional food. The low-fat content in banana extract yogurt can add to the goodness of yogurt as it lowers blood cholesterol levels, maintains stomach health, and prevents digestive tract cancer. This is because the bacteria in yogurt live as probiotics from foods beneficial to the digestive tract.

Reduced Sugar Content

Milk is the main ingredient in yogurt, which contains water, fat, protein, Sugar, and ash (Putri et al., 2021). Milk also contains calcium, B vitamins, protein, and phosphorus. The lactose in milk gives the milk a sweet taste. The research results (Table 5.1) found that the control yogurt contained 11.70 % inverted sugar. The sugar content of yogurt inversion with the addition of banana extract increases along with the increase in the amount of banana extract. The inverted sugar content in banana extract yogurt is 11.96 – 12.40%. The Sugar comes from bananas, which contain 12 grams/100 grams of Sugar.

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5. Conclusion

Kepok banana fruit extract can be used as an additional ingredient (flavor) for yogurt because it comes from vegetables. It is categorized as a halal ingredient in the halal product guarantee process. Adding banana extract can increase the amount of protein and carbohydrate content in yogurt, thereby reducing the acidity of the yogurt, and kepok banana extract can reduce the fat content in yogurt.

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