

The Effect of Yeast Amount on the Organoleptic Properties of Kepok Banana Tapai and Horn Banana (*Musa acuminata* x *balbisiana*)

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Abstract: Tapai is a traditional food that is familiar. Tapai is usually made from glutinous rice or cassava through fermentation. The tapai fermentation process involves the addition of microorganisms to make a tapai into the desired product. The microorganism that is usually used is yeast. Yeast is a khamir (*Saccharomyces cerevisiae*) that functions to convert carbohydrates (starch) into sugar and alcohol. In making tapai, one of the things that must be considered is the use of yeast that is appropriate and at the right dose to produce a quality product. Based on this background, research was conducted using an experimental method of making tapai using substrates, namely kepok bananas and horn bananas which were given different amounts of yeast. This study aims to determine the effect of the amount of yeast on the finished tapai of kepok bananas and horn banana including color, aroma, texture, taste, and level of preference. The method used is an experimental method using research and direct tapai making. The results showed that the use of different yeasts will affect the finished tapai results both in color, aroma, texture, flavor and level of preference. Kepok banana tapai using 2 gr yeast has the highest level of preference compared to the others.

Keywords: Biotechnology, Amount of yeast, Fermentation, Kepok banana tapai, Horn banana tapai..

Introduction

Tapai is a traditional food snack that is quite popular in Indonesia. Generally, there are two types of tapai, namely sticky rice tapai and cassava tapai. In Indonesia, cassava tapai and sticky rice are widely used for dishes such as cakes, mixed ice, tapai candy, compote, and others. Tapai has a sweet taste and contains a little alcohol, has a fresh aroma, a soft texture, and is slightly runny (Hidayat, 2006).

The conditions for making tapai are made from carbohydrates and the use of tapai yeast. Yeast tapai is a substrate made from rice flour with spices and this yeast contains various kinds of microbes, namely fungi, yeast, and bacteria. Fungi can produce enzymes that can break down the starch (starch) contained in sticky rice and cassava into sugar, the sugar is then broken down again by

the enzymes produced by yeast into alcohol, and the next process can become acidic due to the activity of enzymes produced by bacteria. The process of overhauling the molecules of substances contained in raw materials into final products is mainly due to microbial activity (Ahidin, 2015).

The tapai fermentation process with the use of yeast is classified as a perishable food product due to further fermentation after the optimum fermentation conditions are reached, so it must be consumed immediately. The inoculum added in tapai production is usually less than 1% per kilogram of material, and generally 0.2-0.5% (Berlian et al., 2016). The fermentation process for making tapai takes 45 hours and is best done at a temperature of 28-30°C. Indonesia has sources of carbohydrate food other than cassava and glutinous rice, including kepok bananas and horn bananas.

One alternative starchy material for making tapai is bananas considering that banana production ranks first in agricultural products in Indonesia. Utilization of bananas themselves both from the skin to the fruit has been done a lot. In terms of energy, banana waste can be used as a raw material for making bioethanol (Suryaningsih and Pasaribu, 2015). Banana is a tropical fruit, easy to produce, and has the potential for development. Banana is the most popular among other tropical fruits. Bananas have been widely known in Asia and Africa for 3,000 years, then they were produced in the United States (Sondak et al., 2018). The development of banana commodities as a processing material aims to meet demand and increase public awareness of the importance of nutrition, where bananas are a source of vitamins, minerals, and carbohydrates. In addition, bananas are also beneficial for health, including regulating blood pressure, maintaining health, muscle contraction, and bone health (Ahfas et al., 2019).

Banana is a relatively inexpensive fruit. In certain areas, such as Trenggalek, Malang, and Lumajang, unripe bananas are used as banana chips. The home industry of horn banana chips in Trenggalek, Malang, and Lumajang utilizes horn banana in a raw or young state because the texture of the banana flesh is still hard and the sugar content is low, while ripe horn banana are underutilized in the manufacture of chips because they produce less crunchy chips. fried quickly brownish, and difficult in the cutting process. Horn bananas in Trenggalek are very easy to obtain, and in one of the Trenggalek areas, horn bananas are processed in a rather ripe state, which is still underutilized.

Based on the description above, it is known that this research develops from existing theories and research regarding tapai production. This study aims to determine the effect of the amount of yeast on the finished product of kepok and horn banana tapai including color, aroma, texture, taste, and level of preference.

Materials and Methods

Methods

The research was conducted on Friday, May 25th 2018 at the researcher's house located in the Wage Environment, Sumber, Cirebon. The method was used as an experimental method using research and tapai manufacture directly. The research used two different types of substrates, namely kepok banana and horn banana. In the research conducted, the amount of yeast given to each banana was different, namely giving yeast with low, medium, and high concentrations. The data analysis used is descriptive qualitative and quantitative descriptive data analysis. Qualitative descriptive is used to test the final quality produced from tapai production, both taste, aroma, and texture. Researchers used a quantitative descriptive method to test the effect of different amounts of yeast from several research sources as the background of this research.

Tools

Table 1. Tools in Making Kepok Banana and Horn Banana Tapai

No.	Tool's Name	Total	Description
1.	Plate	1	Plastic
2.	Fork	1	Stainless steel
3.	Spoon	1	Aluminium
4.	Tray	1	Plastic
5.	Knife	1	Stainless steel
6.	Gloves	2	Plastic
7.	Plastics	6	Plastic
8.	Labels	6	HVS materials
9.	Newspaper	1	Paper
10.	Digital scales	1	Stainless steel
11.	Stove	1	Stainless steel
12.	Pan	1	Aluminium

Materials

The materials used to make tapai banana horns are as follows:

- a. Kepok banana and Horn banana
Horn banana and kepok banana used are 100 grams each, with the maturity level of the bananas seen from the color of the skin which has the condition criterion number six, that is, all the banana fingers are yellow and the horn banana are slightly ripe.

b. Yeast tapai

The tapai yeast used was 24 grams. Yeast tapai before being used for the manufacturing process must be mashed or ground and sifted.

Procedures

The procedures carried out include; tools and materials being prepared, bananas being selected, and weighing the weight of each banana. Likewise, the yeast that will be used is weighed first as much as 24 grams, and after that, the yeast is mashed on a plate using a spoon. Bananas that have been weighed, and washed first using clean water. After that, the bananas are steamed in the pan for ± 15 minutes. Furthermore, the bananas are allowed to cool first, then the bananas are peeled, and each banana is cut into three parts, then left on a tray until completely cool. After the bananas are cold, the yeast is sprinkled over the bananas in different amounts 2 grams (low), 4 grams (medium), and 6 grams (high). In the next step, bananas are put into white plastic, tied, and labeled. Wrapped bananas are put into a jar with newspaper covered as a lid and fermented for 2 days (48 hours).

Results and Discussion

Color

The average color value of horn banana tapai and kepok banana can be seen in the bar chart (Figure 1):

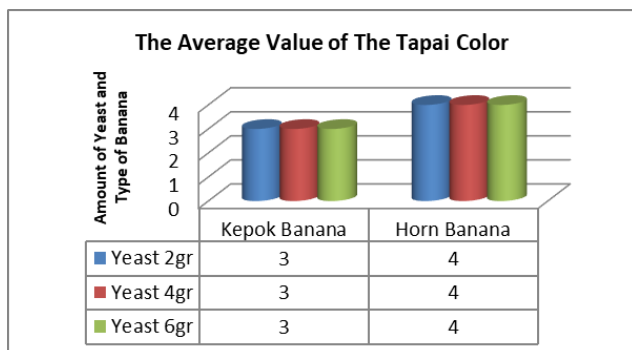


Figure 1. The Average Value of The Tapai Color.

Aroma

The average aroma value of horn banana tapai and kepok banana can be seen in the bar chart (Figure 2):

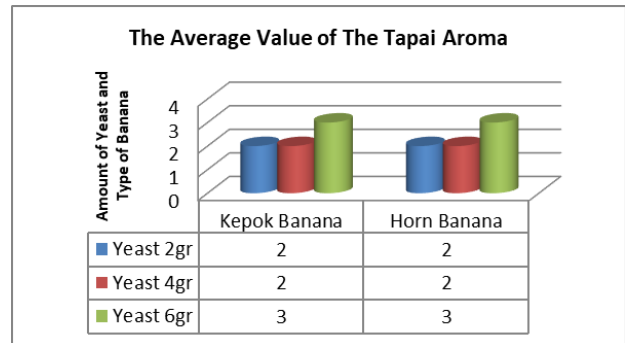


Figure 2. The Average Value of The Tapai Aroma

Texture

The average texture value of horn banana tapai and kepok banana can be seen in the bar chart (Figure 3):

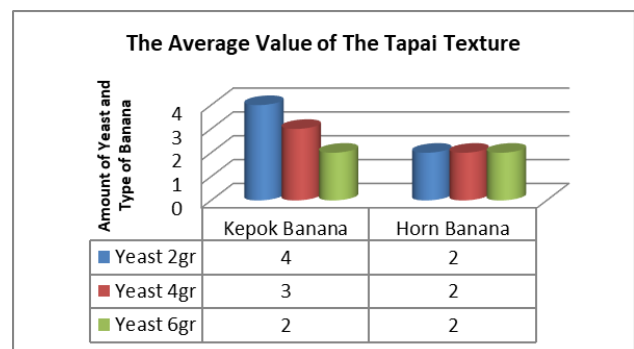


Figure 3. The Average Value of The Tapai Texture.

Flavor

The average flavor value of horn banana tapai and kepok banana can be seen in the bar chart (Figure 4):

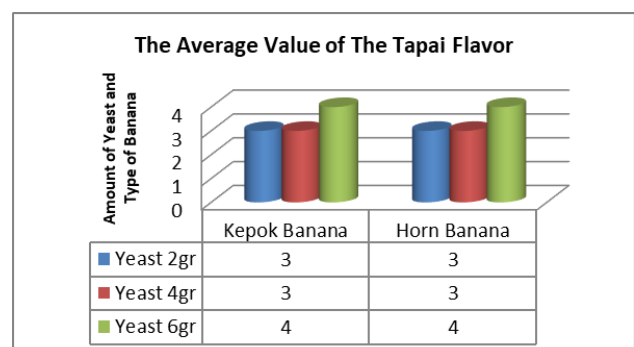


Figure 4. The Average Value of The Tapai Flavor.

Level of Preference

The average level of preference value of horn banana tapai and kepok banana can be seen in the bar chart (Figure 5):

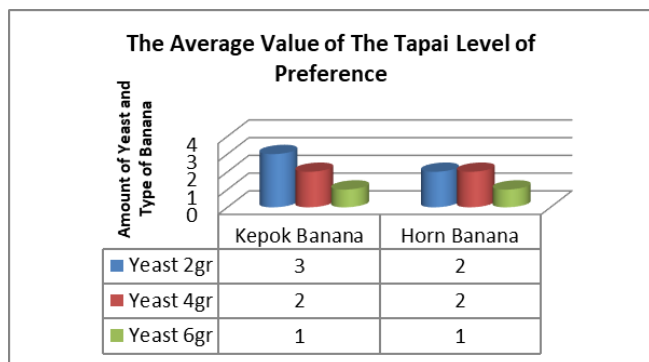


Figure 5. The Average Value of The Tapai Level of Preference.

Discussion

Based on the results of the research that has been done, fermented kepok bananas and horn bananas using different amounts of yeast will produce different aromas, textures, colors, tastes, and levels of preference. The three kepok banana tapai after being fermented with different amounts of yeast turned out to have a color change. Before fermenting, bananas are white, after fermenting bananas are yellowish white. Likewise, the three-horn banana tapai, were originally yellow, but after being fermented they changed color to a deep yellow.

The color of the finished product of kepok banana and horn banana is influenced by the fermentation process. According to Hartati (2009), the fermentation process causes a change in color or material properties due to the breakdown of the food ingredients. Winarno (1986) stated that tapai yeast is a substrate made from rice flour with spices and this yeast contains various kinds of microbes, namely fungi, yeast, and bacteria. Fungi can produce enzymes that can break down starch (starch) in horn banana into sugar, the sugar is then broken down again by enzymes produced by yeast into alcohol, and the next process can become acidic due to the activity of enzymes produced by bacteria. Tarigan (1988) stated that the process of remodeling the molecules of substances contained in raw materials into final products is mainly caused by microbial activity.

Tapai banana kepok and horn banana with low and medium amounts of yeast, have a tapai aroma that is not too overpowering. Unlike the tapai banana which is given a high amount of yeast, has a pungent aroma. These results are following the theory put forward by Simbolon (2008) that the greater the percentage of tapai yeast, the higher the alcohol content and aroma produced. The strong tapai aroma is caused by several aroma-forming compounds which are present in large quantities. Many of these aroma-forming compounds are formed during the fermentation process, namely from the hydrolysis of glucose and the oxidation of alcohol in tapai, and have volatile properties.

The texture produced by kepok banana tapai on average has a soft texture. In contrast to the texture produced by tapai banana horns. The three horn banana tapai that were given low, medium, and high amounts of yeast had a firm texture. The results of this study are not by the theory put forward by Unika (2015) that the greater the percentage of yeast and the longer the fermentation time should affect the alcohol content which increases to produce a soft texture. According to Hidayat (2006), fermentation is a gradual change by enzymes from several types of bacteria, yeast, and fungi. According to Simbolon (2008) the greater the percentage of yeast and the longer the fermentation time affects the increasing alcohol content resulting in a soft texture. During the fermentation process, biochemical and physical changes occur which change the appearance, shape, and flavor of the food. The chemical changes that occur in fermented foodstuffs are not entirely the result of the work of microorganisms, it is estimated that the enzymes contained in fermented foodstuffs also play a role due to the cooking and maturation process.

The taste produced by tapai banana kepok and horn banana with low and medium amounts of yeast has the same taste, which is quite sweet and sour. Whereas tapai banana kepok and horn banana with a high amount of yeast have a taste that is quite sweet and very sour. This is following the theory put forward by Dirayati, (2017) the higher the amount of yeast that is added the more yeast and bacteria are contained in the tapai with the higher microorganisms due to the growth

process so that the taste of horn banana tapai becomes quite sweet and sour. The taste is quite sweet and sour due to a decrease in tapai sugar content. The decrease in tapai sugar levels occurs due to the change of sugar to alcohol carried out by the zymase enzyme produced by microbes found in tapai yeast. According to Ardhana (2000) the longer the fermentation process, the more microorganisms break down starch into glucose and break down glucose into alcohol, and the higher the alcohol content in the tapai, so it tastes sour. Sour taste in tapai can occur if the fermentation continues and the sour taste that is generated is one of the characteristics found in tapai.

Conclusions

Based on the research that has been done regarding the effect of the amount of yeast on the organoleptic tapai of kepok and horn banana tapai, it can be concluded that the use of different yeasts will affect the finished tapai results, both in terms of color, aroma, texture, taste, and level of preference. Kepok banana tapai using 2 gr yeast has the highest level of preference compared to the others.

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