

Effect Of Yeast Concentration (*Saccharomyces cerevisiae*) on Organoleptic Characteristics of Cassava Tape Local Varieties

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ABSTRACT

Cassava is the second largest agricultural food product in Indonesia after rice. One of the processed food products from cassava is tape. Cassava tape is a product resulting from a fermentation process using the yeast *Saccharomyces cerevisiae* as yeast. The organoleptic properties of cassava tape can change depending on the concentration of yeast used. This research aims to determine the correct yeast concentration on the organoleptic results of cassava tape. The method used in this research was the RAL method (completely randomized design) using three samples with three treatments where each treatment used 1 kg of local varieties of cassava, namely R1 with a yeast concentration of 1% (10 grams), R2 1.5% (15 grams), and R3 2% (20 grams). Another method used in this research is observation using a qualitative method approach. The data processing method used is the Analysis of Variance (ANOVA) method then the BNT test (smallest significant difference) as a further test. This research resulted in R2 cassava tape being the best-treated cassava tape with a color value of 13,13, aroma 13,26, taste 14,23, and texture 12,38. The organoleptic characteristics produced by R2 cassava tape have a slightly yellowish-white color, the characteristic aroma of cassava tape is slightly sharp, the taste is slightly sweet and slightly sour and the texture is soft. Differences in yeast concentration had a significant influence ($p < 0.05$) on the organoleptic Characteristics of cassava tape.

Keywords: Cassava Tape; Yeast; Fermentation; Organoleptic.

INTRODUCTION

After rice, cassava (*Manihot esculenta*) is the largest food crop in Indonesia. In addition to cassava being a staple food, Indonesian people used cassava to make tape and other processed foods. Tape is a kind of fermented food with the aid of yeast from the fungi *Endomycopsis fibuligeria*, *Rhizopus oryzae*, or *Saccharomyces cerevisiae* (Kanino, 2019). The microorganism used for the cassava tape fermentation process is *Saccharomyces cerevisiae*. Fermentation can use nuts, grains, and tubers that contain high carbohydrates. Cassava tape is one of the fermented foods that should be enjoyed immediately as once optimal fermentations conditions are achieved, tape degrades quickly.

The research conducted by Sahratullah, Dwi Soelistya, Dyah Jekti, and Zulkifli (2017) using three distinct concentrations of yeast (0.5%, 1%, and 1.5%) showed that the concentration had a significant effect on water content, organoleptic properties cassava tape but no influence was detected regarding glucose contents. Several handling steps to be done for a tape with attractive color, supple texture, distinctive flavor and longer shelf-life). The shelf-life of processed food goods is preserved by fermentation because plant products easily rot or spoil quickly (Kanino, 2019). Based on the description above and the influence of differences in yeast concentration on tape, it is necessary to research "The Effect of Yeast Concentration (*Saccharomyces cerevisiae*) on Organoleptic Characteristics of Cassava Tape Local Varieties".

METHOD

The approach used in this study is qualitative. Sampling was carried out by purposive sampling with a completely randomized (RAL) research design method using 3 treatments and 3 replications using the same fermentation variations, namely R1 (1%), R2 (1,5%), and R3 (2%) so that 9 experimental units

were obtained. Each treatment used 1000 grams (1kg) of local cassava varieties. This research was conducted at UPJ (Department Processing Unit) of SMKI (Islamic Vocational High School) Mbah Bolong as a place for processing and testing organoleptic cassava tape in Watugaluh Village, Jombang Regency in December 2023 somewhat trained panelist to provide organoleptic values for each cassava tape sample. Data from the organoleptic test of cassava tape were then analyzed using the ANOVA (*Analysis of Variance*) method and further testing using the 5% BNT test to determine the effect of the right yeast concentration and the best result of cassava tape treatment.

RESULT AND DISCUSSION (font size 12pt)

Result

The process of making cassava tape uses local varieties of cassava that have white tuber flesh as much as 1 kilogram in each treatment. The first stage in making tape is to choose good tape then peel the outer skin and epidermis and wash it until clean. The epidermis is cleaned with the aim that during the fermentation process, the yeast is not blocked by the epidermis that hardens after the steaming process so that the fermentation process runs well and the yeast works perfectly. The next step is cutting the cassava with a length of 3-5 cm. Cutting cassava functions to speed up the fermentation process because the size of the cassava is not too big, so the yeast can ferment the cassava quickly. After cutting the cassava is steamed for 30 minutes and left at room temperature. The next process is inoculation of yeast on cassava with treatment R1 with a yeast concentration of 10 grams, R2 15 grams, and R3 20 grams. After the yeast inoculation process is complete, the next process is fermentation. The cassava tape fermentation process begins with the conversion of starch in cassava by the amylase enzyme released by microbes into maltose. Maltose can be broken down into glucose by the maltase enzyme. Glucose by the zymase enzyme is broken down into alcohol. In further fermentation of tape, alcohol by the alcoholase enzyme can be converted into acetic acid, pyruvic acid, and lactic acid. The formation of acetic acid, pyruvic acid, and lactic acid is due to presence of *Acetobacter* bacteria which are often found in yeast (Gani & Erlidawati, 2017). Each treatment is placed in a different container according to the treatment used, then closed and left for the same time, namely for 48 hours. After 48 hours, each treatment will be bested for organoleptic which includes color, taste, aroma, and texture, then analyze the data to determine the results of each organoleptic characteristic.

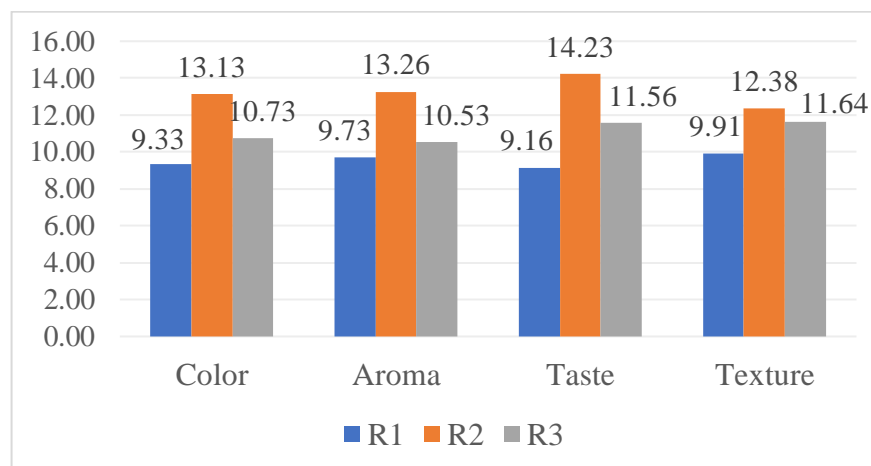


Figure 1. Average Value of Organoleptic Test Results

Table 1 Organoleptic Color Test Value

No	Treatment	Color
1	R1	9,33
2	R2	13,13
3	R3	10,73
BNT 5%		1,39

The color value of R1 is lower than R3, which indicates That R3 is a more attractive color than R1

and is significantly different in the 5% BNT test. R1 and R3 have lower values (not attractive) than R3 values (very attractive) and all three treatments are significantly different in the 5% BNT test.

Aroma

Table 2 Organoleptic Aroma Test Value

No	Treatment	Aroma
1	R1	9,73
2	R2	13,26
3	R3	10,53
BNT 5%		1,86

R2 and R3 have higher aroma values compared to R1, which means that R2 and R3 have a very good aroma compared to R1 which has an unpleasant aroma. R1 is not significantly different from R3, but significantly different from R2 in the 5% BNT test, and R3 is significantly different from R2 in the BNT test.

Table 3 Organoleptic Taste Test Value

No	Treatment	Taste
1	R1	9,16
2	R2	14,23
3	R3	11,56
BNT 5%		1,69

The taste value of R3 is higher than R1, indicating that R3 has a better taste than R1 and is significantly different in the 5% BNT test. At the same time, the value of R3 is lower than R2 and is significantly different in the 5% BNT test. This indicates that R2 has a very good taste than R3 and R1.

Table 4 Organoleptic Texture Test Value

No	Treatment	Texture
1	R1	9,91
2	R2	12,38
3	R3	11,64
BNT 5%		1,64

R3 has a higher value than R1 which shows that R3 has a more preferred texture compared to R1 and has a significant comparison in the 5% BNT test. At the same time, R2 has a higher value and is significantly different in the 5% BNT test compared to the R3 value which shows that R2 has a very preferred texture compared to R3 and R1.

Discussion

The result show that cassava tape with treatment R1 is slightly yellowish white and R3 has a yellow color, while R2 is yellowish white. Color changes by the amount of yeast concentration used. Judging from the study's results, the more yeast used, the more yellow the color of the tape produced. The effect of differences in yeast concentration on the organoleptic results of cassava tape is strengthened by the result of research by Zulkifli et al. (2017) which concluded that yeast concentration affects water content and organoleptic but does not affect the glucose content of cassava.

R1 has a distinctive aroma of cassava tape which is slightly sharp while R3 has a very sharp aroma of cassava tape. R2 has a sharper distinctive aroma of cassava tape compared to treatment R1. The alcohol compound that is the distinctive aroma of cassava tape is caused by the fermentation process. This is because starch has been broken down by microorganisms into simpler compounds, even those that were previously solid are changed into liquid form (water and organic acids) and gas or alcohol (Lestari & Susanto, 2015). The fermentation process not only causes a preservation effect but also causes changes in the texture, taste, and aroma of food ingredients which make fermented products more attractive, easy to digest, and nutritious (Mahyarudin, 2010)

R1 has a slightly sweet and slightly sour taste while R3 has a sweeter and more sour taste because the concentration of yeast used is higher. Cassava tape R2 has a slightly sweet and slightly sour taste. The sweet taste is caused by starch converted by the amylase enzyme into sugar/sucrose (Marjoko & Hersoelistyorini, 2011). The duration of this fermentation process should not exceed three days. If it exceeds the three-day limit and too much yeast is given, the tape will taste increasingly sour. Too much yeast concentration causes the simple sugar produced during the fermentation process to decrease, this happens because the sugar will be converted into alcohol. As a result, the sweet taste of the tape will decrease (Kanino, 2019).

R1 has a rather soft texture, while cassava tape R3 has a very soft texture (mushy). Cassava tape R2 has a soft and not mushy texture. The texture of tape becomes soft because of the change in carbohydrates into glucose as a simpler carbohydrate (Marjoko & Hersoelistyorini, 2011). In addition to the fermentation factors, factors that can affect the texture of tape are yeast concentration. The amount of yeast given can also affect it because too much yeast is given, it can make the tape very soft (Islami, 2018).

The best treatment in the organoleptic test of cassava tape was the R2 treatment with a yeast concentration of 1.5% (15 grams) for 1 kilogram of cassava. Cassava tape with the best treatment obtained a color value of 13.13, aroma 13.26, taste 14.23, and texture 12.38. Cassava tape with the best treatment has a yellowish-white color, a typical tape aroma that is not sharp, a typical delicious taste that is slightly sweet and slightly sour, and a soft texture.

CONCLUSIONS

Based on the research results obtained, the conclusions obtained are: different treatments in providing yeast concentration in making cassava tape from local cassava varieties have a significant effect on the organoleptic properties of cassava tape. The higher the concentration of yeast given, the more yellow the tape color, the sharper the aroma, the more sour the taste, and the softer the texture. The right yeast concentration in the fermentation process of local cassava tape is R2 treatment (1.5%/15 grams) for 1 kilogram of cassava will provide a sharper, more delicious aroma of cassava tape, yellowish white color, a distinctive slightly sweet and slightly sour taste, and a soft texture.

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