
**THE EFFECT OF LONG BOIL BLACK CASSUM (*Manihot aipiphol*)
ON THE PRESENCE OF BACTERIA**

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Received: 19 December 2020

Accepted: 16 January 2021

Published: 25 March 2021

ABSTRACT

Processing of black cassava has the possibility of microbial contamination because the fermentation process is carried out in the open, black cassava in the open, at room temperature, allowing microbes such as bacteria to grow. The aim of this research is to determine the length of time for boiling cassava and the presence of bacteria, and to determine the appropriate boiling time that can inhibit the presence of bacteria. From the results of observations of cassava samples containing bacteria before boiling, this shows that fresh cassava used as raw material naturally contains a number of bacteria. Observing the colony characteristics of all bacterial isolates counted and uncounted, it was found that there were similarities and differences in properties, where the results of the analysis showed that the long boiling time treatment had a great influence on the morphology of the bacteria, namely round and wrinkled, with smooth and grooved edges, raised elevations, flat and thick. The color of the bacteria on black cassava is the same, namely white, with treatment times of 10, 20, 30 minutes. The boiling time treatment has a very significant effect on the shape, edges and elevation in the presence of bacteria. The presence of bacteria in black cassava before boiling shows that it naturally contains a number of bacteria, with long boiling treatment the number of bacteria increases.

Keywords: *cassava, boil, bacteria.*

To cite this article:

Masbait, M., Rehena, J.F., Pattipeilohy, M. 2021. The effect of long boil black cassum (*manihot aipiphol*) on the presence of bacteria. *Rumphius Pattimura Biological Journal*. 3 (1): 11-14. DOI:<https://doi.org/10.30598/rumphiusv3i1p011-014>

INTRODUCTION

Cassava, which belongs to the Euphorbiaceae family, is a plant that has long been known and cultivated by Indonesian people. This can be seen from the distribution of these commodities in almost all provinces in Indonesia. Cassava is a source of carbohydrates, and is widely used for food, feed and industrial raw materials. Cassava is the third staple food in Indonesia after rice and corn. Cassava produces leaves and tubers. The tubers can be processed into cassava and tapioca flour, while the leaves can be consumed as vegetables (Hafzah, 2003). Cassava has the main nutritional component of carbohydrates, which is 34g. However, apart from carbohydrates, cassava also contains various other nutritional components, including: 62.50g water, 1.20g protein, 0.30g fat, 40mg phosphate, 33mg calcium, 30mg vitamin C, 0.070mg iron, 0.06mg vitamin B1 and calories. the largest is 146 cal (Koswara, 2009). Prawati, Richana and Suismono (2011) fresh cassava consists of 60% water content, 35% starch, as well as 2.5% protein content and 1% ash content. Cassava contains many benefits for the body's needs. Apart from containing carbohydrates, cassava also contains protein, vitamins, iron, calcium and phosphorus. The higher iron content is found in the tuber skin compared to the tuber. Iron is also found in cassava leaves. Cassava leaves also contain vitamin A and

cyanide acid (HCN). Cyanide acid is classified as a toxic compound and is a limiting factor in the utilization of cassava plants (Akinfala et al., 2002).

The cassava plant (*manihot* sp) is the third staple food after rice and corn. Cassava has the potential to be an important source of carbohydrates as a food ingredient, especially for developing countries, such as Indonesia. Cassava is consumed by the world's population, especially residents of tropical countries, and every year around 300 million tons of cassava are produced (Simanjutak, 2002). The advantage of cassava plants compared to rice as a staple food is that cassava can grow on dry and less fertile land, is resistant to various pests and diseases, and the harvest period can be postponed, that is, left in place for a certain time, the leaves and tubers can be processed into various main meals or snacks. Apart from that, cassava plants have quite high adaptability and farming is relatively easier, and also has various benefits, both for food, feed and industrial raw materials (Lingga, 1993). Cassava has a chromosome number of $2n = 36$ (Jennings, 1963). The heterozygicity of this plant is very high, so that in the hybridization program it is very easy to obtain seeds with diverse genetic composition. There are several characteristics of cassava plants that are known to be controlled by simple genes and can be distinguished between recessive and dominant characteristics (Hersey, 1988). These characteristics include normal leaf color (dominant), albino leaves (recessive), straight stems (dominant), zig-zag stems (recessive), yellow (dominant) and white (recessive) cassava flesh color, leaf blade edge shape. curved (dominant) and straight (recessive).

The morphological composition of cassava plants consists of roots, stems, leaves, flowers and fruit. The roots of cassava plants are taproots and grow into dicotyledonous plants, and the roots are also a place to store food reserves and also enlarge so that the tuber forms into cassava. The stem of the cassava plant has an elliptical shape and is also woody so it has nodes. Apart from that, the stem can grow elongated and even measure around 2-3 cm. Apart from that, the diameter varies depending on the variety and species. The color of the stem is brownish and also there is a small protrusion hanging from the cork inside the stem. The leaves of the cassava plant have a finger shape or are called paminervis. Cassava leaves have long stalks or petioles and leaf blades that are almost the same as the palm of your hand, and the stalks have about 3-8 leaves. Young cassava leaves are green, and old cassava leaves are dark green. Cassava Plant Flowers, flowers have signs that appear when the root plant bears fruit, as do cassava plants. Based on its morphology, the flowers fall into a single flower tent system with a size of 1 cm. Apart from that, the flowers only have one house. The female flowers have a protrusion and thickening of the yellow flower base surrounding the fruit. Meanwhile, the male flowers on this cassava plant also have flower tents that are shaped like like a bell, and is stuck around the thickening of the base of the flower and is curved. Fruit of the Cassava Plant, the fruit is a tuber that forms roots and finally bears fruit. The shape and function of the tuber contains starch with a dark white color and each plant almost succeeds in producing 5-10 fruit per crop.

METHODE

This research uses an experimental research type. The aim was to determine the effect of boiling time for black cassava on the presence of bacteria. Cassava samples of 20 grams from each treatment totaled 80 grams plus controls taken by purposive sampling.

Procedure

1. Making black cassava begins with soaking. using sea water, with soaking times of 12, 24, 36 and 48, soaked in a basin that has been labeled for each basin.
2. After that, the cassava is hung on the house drain. In this process, the cassava must not be directly exposed to the sun. Leave it for 3 weeks and mold has grown on the cassava, indicated by the color changing to black, then the fungus on the black cassava is cleaned with running water and boiled.
3. Boil
 - a. In the initial stage of the boiling process, 4 samples of black cassava were used with different treatments, namely 12, 24, 36 and 48 hours to compare the length of boiling time.
 - b. Of the 4 existing treatments, these 4 samples were divided into 3 treatments for the boiling process to be carried out with different times, including 10 minutes, 20 minutes and 30 minutes.
 - c. Each sample of black cassava will be weighed using an analytical balance and divided by 3 for each treatment according to the boiling time. After being divided into each treatment, the cassava will be boiled, but before that it is washed and soaked, then heated for 15 minutes/hour, then heated in water on the stove until the water boils.
 - d. then, add the soaked black cassava pieces with different boiling times of 10 minutes, 20 minutes and 30 minutes.

- e. After boiling is complete, remove the sweet potato and place it on a plate and wait until the sweet potato cools. and smoothed using mortal. This process was carried out repeatedly according to the hours of each treatment, namely 12, 24, 36 and 48 hours.

DISCUSSION RESULT

The number of bacteria in soaking for 12 hours with a boiling time of 10 minutes showed that the highest number of bacteria was in the 10⁻³ dilution with a total of TBUD or more than 300 bacterial colonies, while for boiling for 20 and 30 minutes the number of bacteria ranged from 95-200 colonies. The number of bacteria in 24 hour soaking with a boiling time of 10 minutes showed that the highest number of bacteria was in the 10⁻³ dilution with a total of TBUD or more than 300 colonies of bacteria. Meanwhile, for boiling for 20 and 30 minutes, the number of bacteria was around 97,187 colonies. The number of bacteria in soaking for 36 hours with a boiling time of 10 minutes shows that the highest number of bacteria was in dilution 10⁻³ with a total of TBUD or more than 300 bacterial colonies. that the number of bacteria in soaking for 48 hours with a boiling time of 10 minutes shows that the highest number of bacteria was in dilution 10⁻³ with a number of TBUD or more than 300 bacterial colonies, while for boiling for 20 and 30 minutes the number of bacteria ranged from 95-126 colonies.

The bacterial composition for 12 hours, 24 hours, 36 hours and 48 hours during the 10 minute, 20 minute and 30 minute treatment varied greatly in number according to the boiling time. Fluctuations in the number of bacteria are thought to be related to the availability of nutrients in black cassava, as according to Rahman (1989) that bacterial cell growth will continue indefinitely but because growth takes place by consuming nutrients while simultaneously releasing metabolic products that are formed so that after a certain time the number of microorganisms will decrease which is caused by a reduction in several nutrients produced. The presence of bacteria in the cassava samples before boiling shows that the fresh cassava used as raw material naturally contains a number of bacteria, then with long boiling treatment the number of bacteria increases. The number of bacteria tends to increase and sometimes decrease. Where is the total number of bacteria from black cassava samples before boiling, microorganisms that grow on each medium and show differences in shape, edges and elevation. Based on observations of the colony characteristics of all counted and uncounted bacterial isolates, similarities and differences in properties were obtained which were shown in the research results, where the results of the analysis showed that the long boiling time treatment had a great influence on the shape of the black cassava, namely round and wrinkled, with smooth and curved edges. , as well as raised, flat and thick elevations. The research results also show that the color of black cassava is the same, namely white, with treatment times of 10, 20, 30 minutes.

Observing the colony characteristics of all bacterial isolates counted and uncounted, it was found that similarities and differences in properties were shown in the research results, where the results of the analysis showed that the long boiling time treatment had a big influence on the shape of black cassava, namely round, irregular, threaded and rhizoid. . With smooth, wavy edges, and raised, flat elevations. The research results also show that the color of black cassava is the same, namely white, with treatment times of 10, 20, 30 minutes. Observing the colony characteristics of all counted and uncounted bacterial isolates, similarities and differences in properties were obtained which were shown in the research results, where the results of the analysis showed that the long boiling time treatment had a great influence on the shape of black cassava, namely round, irregular, rhizoid and wrinkled. With smooth, wavy and curved edges, and raised and flat elevations. The research results also show that the color of black cassava is the same, namely white, with treatment times of 10, 20, 30 minutes. Based on the colony characteristics of all counted and uncounted bacterial isolates, similarities and differences in properties were obtained which were shown in the research results, where the results of the analysis showed that the long boiling time treatment had a great influence on the shape of the black cassava, namely round and thready, with smooth, wavy and smooth edges. grooved, as well as raised and flat elevations. The research results also show that the color of black cassava is the same, namely white, with treatment times of 10, 20, 30 minutes.

CONCLUSION

The boiling time treatment has a very significant effect on the shape, edges and elevation in the presence of bacteria. The presence of black cassava before boiling shows that it naturally contains a number of bacteria, with long boiling treatment the number of bacteria increases. It is necessary to carry out a more complete characterization of the presence of bacteria with variations in boiling time. In addition, it is hoped that further research will be conducted on the effect of boiling time for black cassava on the presence of bacteria through controlled technology.

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