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# The Effect of Washing Treatments and Natural Adsorbent Application to the Quality of Fresh Cassava (*Manihot utilissima*)

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**Abstract**
*A research to know the influence of washing treatments and various natural adsorbent as storage media of fresh cassava has been done in Agriculture laboratory of the University of Islam Malang. The research was done using 2 factors (washing treatment and of natural adsorbents). The first factor consisted of 2 levels: no washing and washing treatment. The second factor consisted of 5 levels (without natural absorbent, river sand, charcoal husk, wood charcoal, and ashes). The storage was done for 2 weeks. The parameters observed were weight loss (%), moisture content (%), total soluble solid, total microbes, and sensory test (colour, aroma, and taste of the cassava). The result showed that quantitatively the cassava stored in the river sand without water treatment gave the best performance. It had the highest water content (33,40%) at the last observed (2 weeks storage). Respondents liked the cassavas which were stored in the river sand as adsorbent media. Further research using river sand I as the natural adsorbent in cassava storage should be done accurately to know the effect of the adsorbent to the nutrition change and economic value of the storage system.*

*Key words : cassava,washing, natural absorbend.*

## Introduction

Cassava is the third important staple food in Indonesia after rice and maize. The performance of cassava production in Indonesia is continuously increasing since 2018 at 1.51% and the productivity fluctuates at the average of 23.99 tons/ha.(Rozi et al., 2022) Cassava can be cultivated almost in all places, including in the dry area as the plants don't need specific growth requirements (Pushpalatha & Gangadharan, 2020). Cassava is known as raw materials for SME (Small and medium Entrepreneur) food industry. The main problem faced by the small industries using cassava as raw materials is that cassava roots could not be kept in the fresh state for more than a few days after harvest (Tomlins et al., 2021). In the open air condition, they will become bluish after being stored for more than three days. This will reduce the quality of food products processed using this kind of material. According to Barau et al. (2023), increased availability of food for consumers can be

achieved through the advancement of properly available storage procedures and smart post-harvest management strategies. Inappropriate storage produced contamination of agricultural products. It is resulting in food losses or waste, particularly in the tropics. Losses during storage are caused by a variety of circumstances, including poor handling and storage structures, incorrect harvest time for perishables, and inadequate postharvest treatments of the items before and during storage. I

Thus, serious efforts to extend the shelf life of fresh cassava is important to do. Cassava cracker producers in Donomulyo, South Malang, overcome these problems by washing and storing up the fresh cassava in the sand river right after harvesting. According to their experience, it can prolong the freshness and quality of cassava more than a week. According to (Zainuddin *et al.,* 2018) and (Rahmawati *et al.,* 2022) environmental factors play an essential role in deterioration response of cassava storage. Rahmawati (2022) also showed that the storage period affected the development of microbiological infections. Washing treatment is aimed to eliminate the soil, which potentially brings microorganism that can cause spoilage in fresh cassava along the storage time. Until now, there has been little research into these practices in a comprehensive scientific study. This study is aimed to determine the effect of washing treatment and application of various natural absorbent media in prolonging the shelf life of cassava (*Manihot utilisima*).

**Research Methods**

The Research was conducted at the Laboratory of the Agriculture Faculty University of Islam Malang from March to May. The main material used were cassava (Manihot utilissima) obtained from Tempursari, Donomulyo, South Malang. The fresh and unwounded cassava were chosen uniformly in size, weight, and the rate of aging. Other materials used in this study were natural adsorbent materials: river sand, husk charcoal, ashes, and wood charcoal.

This study was arranged in factorial and used randomized block design with two factors. The first factor is the effect of washing consists of 2 levels (washing and no washing ). The second factor is a natural absorbent material that consists of four levels: no absorbent material, river sand, husk charcoal, wood charcoal, and Ashes. There were 8 combinations of treatments, each treatment was repeated three times.

Research Implementation

Fresh cassava was taken carefully from the land. The washing process was done using water flow to eliminate the soil but still retained the brown layer. Fresh cassava then stored in the adsorbent media according to treatment in an open-air condition. the Quality observations were done after 2 weeks of storage. The parameters observed were weight loss (%), moisture content (%), total soluble solid, total microbes, and sensory test (color, aroma, and taste of the cassava).

Data Analyze

The data obtained in this study were analyzed using analysis of variance. If the treatment were significantly affected the observed variables, the analyze will followed by DMRT test. To see the effect of the treatment is done using the probability of error of the results of analysis of variance. If the probability of error is less than 0.05, then the treatment significantly affected the observed variables at 5% level.

**Result and Discussion**

The result showed that there was no significant interaction between washing treatment and application of natural adsorbent to total soluble solids and total microbes. meanwhile, there was a significant interaction between the two treatments on the water content of fresh cassava after 2 weeks storage. Separately, natural adsorbent application and washing treatment also did not show any real effect on all variables observed.

Table 1 showed that the washing cassava kept in the river sand and had the highest water content (33.401%), but it was not significantly different from the nonwashing cassava kept in the open air and the washing cassava stored in husk charcoal media. The result was supported by the previous research by (Quevedo et al., 2014). It was said that box storage of cassava using either moist sand or sawdust packing medium effectively prolonged the shelf life of fresh cassava roots for 30-60 days by minimizing the incidence of vascular streaking, decay, and weight loss and by preserving the desirable eating quality.

Table 1. The effect of treatments to the water content of freh cassava after 2 weeks storage

| Treatments | | Water Content (%) |
|---|---|---|
| **Washing** | Without absorbent | 29,184b |
| | River sand | 33,401b |
| | Husk Charcoal | 11,448a |
| | Wood Charcoal | 16,703ab |
| | Ashes | 14,127a |
| **No washing** | Without absorbent | 16,107ab |
| | River sand | 18,639ab |
| | Husk Charcoal | 29,725b |
| | Wood Charcoal | 18,159ab |
| | Ashes | 20,451ab |

Note : The numbers followed by same alphabeths, showed no significantly differences between the treatments.

The results of the organoleptic test from 10 untrained respondents indicated that the highest preference level the respondents for color, taste, and aroma are on cassava that is stored on the river sand as the adsorbent media. Fresh cassava stored on the river sand (P1A2 and P2A2) still looks fresh white. This study showed that the river sand has a potential to be developed as a natural adsorbent media for cassava storage. Further studies related to the effect of the use of river sand to the changing of cassava nutritional content, the cyanide content reduction and economic impact of the storage due to losses and decay is needed to do more in-depth. A similar study conducted by (Akpam & Abakura, 2024) using dry grass, sawdust, and river sand in sweet potato storage found that consumers still prefer the skin color, aroma, and taste of sweet potato processed products stored in river sand over sawdust, which is in line with the results of this study. However, the study conducted by (Akpam & Abakura, 2024) revealed that dried grass waste has a higher potential as a storage medium than river sand.


Notes : P1 : washing P2 : No washing A1 : without adsorbent A2 :river sand A3 : Husk charchoal a4 :wood charchoal A 5 : Ashes Figure 1. Cassava performance after 2 weeks storage.

**Conclusion and Recommendations**

According to the findings of the study on the effect of washing and the use of natural absorbent materials on the freshness and storability of cassava, washing and not washing fresh cassava produced similar results in terms of quantitative observations. However, qualitative observations show that only cassava preserved in river sand media is of high quality, remaining fresh and white. In the organoleptic test, respondents tended to like the products generated. Only sand and wood charcoal, out of the four natural absorbent materials employed in this study, are appropriate for use as media to extend cassava shelf life. Further research is needed to assess the impact of the adsorbent media on cassava's chemical content as time passes, such as phenol, HCL, and starch quality.

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