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# Is it feasible to establish a connection between cassava and rice in terms of their image?

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**ABSTRACT** Cassava can be consumed through various processing methods, including boiling, frying, grilling over wood charcoal, and pounding and processing into a starchy paste known as getup. During its day, this tradition exhibited qualities that were commendable, pragmatic, and held significant worth. Nevertheless, successfully adopting these preparations and cuisines among the millennial age and age Z necessitates ingenuity and inventiveness. This study investigates the potential of cassava rice as a viable alternative to paddy rice while also proposing strategies to enhance the reputation and market perception of cassava rice to match that of paddy rice objects. The researchers employed a systematic literature review methodology, which was subsequently followed by a comprehensive analysis and comparison of the data put forth in earlier investigations. The findings of the study indicate that cassava rice has the potential to serve as a viable alternative to traditional rice on a national scale. Hence, cassava rice can be analogous to regular rice due to its significant carbohydrate content, allowing it to fulfill the same dietary role. The primary objective of this research is to establish a foundation for micro companies to conduct experimental trials in order to substantiate the advantages of cassava rice, both in terms of its nutritional value and its potential for use in various recipes. The research is constrained by its methodology, which relies on longitudinal and laboratory findings as the theoretical foundation.



## 1. INTRODUCTION

Cassava, also known as Manihot esculenta, has a diverse array of cultivars and offers a multitude of advantages. Cassava exhibits a carbohydrate content of 38 grams per 100 grams, which corresponds to a proportion of 12%. Cassava has been identified as a viable alternative to rice (Edhirej, 2017; Jalloh et al., 1991; E. D. Yuniwati, 2019). Cassava can be consumed through diverse culinary preparations, including boiling, frying, grilling over wood charcoal, boiling followed by pounding, and subsequent processing into getup. During its day, this tradition had positive attributes, practicality, and significant worth (Jalloh, 1998; Nugrahani, 2019; E. D. Yuniwati, 2018b). Nevertheless, the successful incorporation of these preparations (Machfudz, 2020) and dishes necessitates a level of ingenuity that appeals to the millennial generation and future Generation Z.

In contemporary times, there is an increasing level of consciousness regarding food goods. Consumers not only seek food items that satisfy their hunger and provide a pleasurable taste experience but also consider the nutritional composition and its impact on overall well-being. 2018 witnessed a growing and heightened awareness of the importance of maintaining healthy consumption patterns (Schwan, 2007; Yisa, 2016; E. D. Yuniwati, 2018a). There are multiple rationales for individuals' consumption of nutritious food, with one such motive being the aspiration to mitigate the likelihood of severe ailments and extend one's lifespan (Liu, 2022; Nguyen-Orca, 2020).

Rice, along with maize, sago, and cassava, is considered a fundamental dietary component for Indonesians (Abe, 2002; Antari, 2014). Rice is the predominant starch source for most of the global population, particularly in Asia, including Indonesia. This staple crop is crucial in meeting approximately 40% of the daily caloric intake for individuals residing in this region. Rice consumption per capita experiences an almost twofold increase in both Middle Eastern and Latin American nations (Harlina et al., 2023). Generally, rice is commonly consumed by cooking it into a dish known as nasi, which consists primarily of rice.

The nutritional makeup of rice is influenced by the geographical conditions in which it is cultivated. Regional variations exist in the preferences for the amylose concentration level in rice. Rice varieties with low amylose content tend to possess a sticky texture, rendering them highly favored in numerous nations, including Japan, Taiwan, etc. On the other hand, Indonesia exhibits a preference for rice cultivars characterized by a high amylose content, resulting in the production of rice products with a firm texture (Kamphayae, 2017; Khang, 2004; W. et al. D. Yuniwati et al., 2012). In addition to amylose, the presence of amylopectin in rice also plays a role in determining the resulting texture of the rice (Inthapanya, 2016; Klang, 2020).

Multiple studies have indicated that rice, as a staple food, serves as a prominent source of carbohydrates characterized by a high glycemic index. Consequently, its consumption has been associated with elevated blood sugar levels, thereby augmenting the susceptibility to diabetes mellitus (Ampapon, 2016; Ampapon et al., 2016; Inthapanya & Preston, 2014). In contrast, it has been shown that white rice possesses a relatively limited quantity of essential minerals, such as magnesium and fiber, associated with potential diabetes

prevention (Gongruttananun, 2013; Inthapanya, 2019; E. D. Yuniwati, 2020).

The glycemic index is a metric used to quantify the rate at which glucose is released into the bloodstream following food consumption. The purpose of this metric is to assess the impact of diet on blood glucose levels within the human body (E. D. Yuniwati, 2010). The advantages associated with a low glycemic index include the enhancement of blood sugar and lipid profiles, the regulation of hunger, the maintenance of insulin levels, and the prevention of heart disease (E. D. Yuniwati, 2021). There exists variation in the glycemic index across different varieties of rice. Several factors influence the variations in the glycemic index of rice, such as the kind or variety of rice, the processing method employed, the parboiling process, the presence of bioactive compounds, and the ratio of amylose to amylopectin (Schwan, 2007; Tang, 2018; Wulandari et al., 2022).

Numerous research endeavors have been undertaken to develop rice cultivars with a reduced glycemic index, given the extensive global rice consumption. These investigations have explored diverse approaches, such as the utilization of gamma-ray radiation (Hurtada, 2020; Manasikana et al., 2023) and the application of ultrasound and cooling techniques (Darmayanti, Utomo et al., 2023; Urbain et al., 2021). In addition to engineering, several academic inquiries have prompted the exploration of alternative primary food sources beyond rice. In addition to assessing the nutritional composition, the consideration of alternative primary food sources also encompasses an examination of their availability. Cassava cultivation is characterized by its ease of planting and ability to thrive in many regions. The availability of cassava in the upstream sector is sufficient and, in fact, plentiful, provided that farmers are provided with incentives in the form of fair payments for activities such as planting, maintenance, harvesting, and post-harvest processes. The primary objective of this essay is to enhance the standing of cassava, a well-recognized dietary replacement that is considered comparable to rice.

## 2. METHOD

The research methodology employed in this study involved utilizing a systematic literature review approach. The procedural sequence employed in this study is visually represented in Figure 1 (Darmayanti & In'am, 2022).

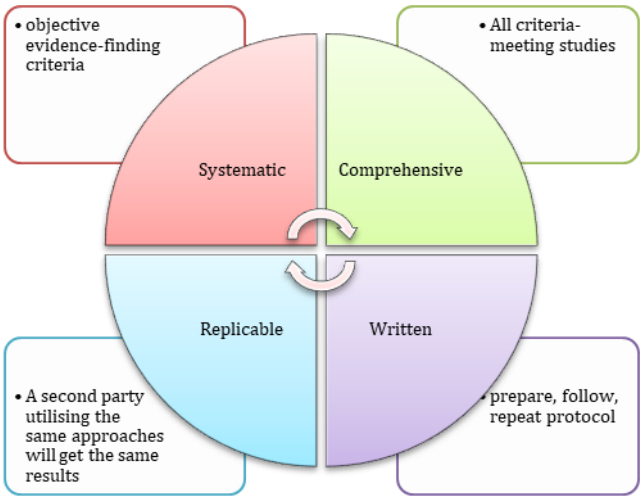


*Figure 1. visually represented*

Figure 1 explains that "systematic" pertains to applying objective criteria in discerning evidence that distinguishes rice from cassava rice. A comprehensive method entails including all research that satisfies the required criteria, which involves gathering scholarly articles, theses, and papers derived from original research published in journals ranked at least SINTA 3 to Scopus within the past five years (Rahmah et al., 2022). A total of eleven pertinent papers were identified. The procedure entails the development of a protocol, strict adherence to said protocol, and replication of the methodology. Specifically, it compares cassava processing practices across various locations and countries to derive solutions to existing challenges and make research-based conclusions.

## 3. RESULT AND DISCUSSION

### *3.1. Fallow rice*

Food product awareness rises. People choose whole, flavorful, nutritious, and healthy foods. Healthy eating awareness rose in 2018. Eating well reduces critical illness risk and extends life (Anggraini et al., 2022; Apata et al., 2018; Polthanee, 2014). Indonesians eat rice, maize, sago, and tapioca. Most Asians, including Indonesia, eat rice for 40% of their calories. Per capita, Middle Eastern and Latin American rice consumption doubled (Apata, 2018). In nasi, rice is cooked.

Rice nutrition relies on its environment. Regions favor various rice amylose levels. Japan, Taiwan, Cambodia, Thailand, Laos, Australia, northern and southwest Chinese regions, and southern Vietnam love sticky low-amylose rice. By choosing high-amylose rice, Indonesia produces hard rice (Darmawan, 2017; Darmayanti, 2023; Puonti-Kaerlas et al., 1999). Along with amylose, amylopectin impacts rice texture (Bandumula, 2018).

Due to global rice consumption, numerous studies have used gamma-ray radiation or ultrasound and refrigeration to generate low-glycemic rice types (Asibi, 2019). Non-rice substantial foods are sought through engineering and other studies. Alternative primary food sources should include availability and nutritional content.

### *3.2. Cassava Rice*

(Analianasari, 2020; Hidayat et al., 2017; Pudjihastuti, 2019) I have highlighted how Hong Kong rice can replace rice. Research on cassava eating may enhance Nigerian farmer incomes (Kouamé & Kouassi, 2014). World body research supports cassava's appeal. Sale, output, and confidence to earn more are affected. Ghanaian cassava prices determine usage. Customer willingness to pay (IDP) must be determined, although quality and taste are approved (Tharise, 2014). This is worse than wheat bread costs. In bulk, the bakeries and small shops like Alfa Maret and Indomaret receive wheat from

Australia at Tanjung Priok, processed in Bogasari. Nine-piece bread costs Rp. 10,000–Rp. 12,500 in Indonesia. Wheat bread is priced the same in big and small cities.

### *3.3. Enhancing Cassava Rice's Value, Alignment, and Image*

People who harvest cassava sell it right away. Because it rots and changes color, cassava can be sold for up to three days. Upstream storage issues are the first hurdle. Refrigerator storage can solve the problem, but it is pricey. Although cassava raw materials can be held longer before processing, they cannot replace bread or rice (Abidin et al., 2023; Chatpapamon, 2021). A similar Indonesian study supports Ogunde et al. Research (Darmayanti, Milshteyn, et al., 2023; Riono et al., 2023; Setyaningrum et al., 2023) shows that buying and using cassava is still uncomfortable. This product only benefits from low raw material prices, not derivatives like cassava rice. Invite and assist the government, small entrepreneurs, and Micro. The solution is holistic to benefit everyone in the supply chain. Cassava costs Rp. 5,000 per Kg in traditional marketplaces, according to random field investigations.

In branded retail marketplaces like Buah Total, Kg costs IDR—20,000. Farmers only get IDR 2,000 to Rp. 3000 per Kg in traditional markets brought from Bogor, Lembang, and supply areas to the capital (Kusnawan et al., 2023; Putriani & Mujahidin, 2023; Sari et al., 2023). Thus, this price does not encourage farmers. Only the midstream-to-downstream supply chain is studied. After BULOG found a store of cassava sego ready to be processed downstream into ready-made food, a literature review was conducted to secure a mid-stream supply—a picture of cassava rice stock.

### *3.4. Taste Issue*

The benefits of cassava are listed below. Cassava contains carbohydrates (Kurniawan et al., 2023), lipids (Sudiantini et al., 2023), proteins (Zain et al., 2023), and minerals (Olude, 2021; Suharsiwi et al., 2022). The benefits of cassava include carbs and lipids, the body's primary energy sources. Industry can dehydrate cassava into chips, pellets, tapioca, and songkok as a carbohydrate supply. Industrial hydrolysis produces inverted sugar, high fructose syrup, dextrose, maltose, glucose syrup, and sucrose. Industry ferments vinegar, butanol, acetone, lactic acid, citric acid, monosodium glutamate, and glycerol. Exploring the glycemic content that harms people with diabetes is needed to enrich this research. While cassava has 79 glycemic levels, white rice has 82, according to (Rice, 1977; Zahroh, 2017). Only 47 in brown rice. Lower glycemic load of 43 for sorghum. Unlike cassava, the raw material is scarce. Tri-in-one packings like cassava rice, teriyaki chicken, and tempeh in saleable packaging can solve this difficulty. The packaging also lists the rice's brand, nutritional value, and shelf life. To gain publications, vocational colleges might work with nutrition labs and the Ministry of MSMEs. Halal acceptance and fulfillment are required beyond publication.

To flavor wheat flour, Owusu et al. (2017) advised mixing starch with it. The public will pay more for this mixture if they know it contains cassava. Cassava flour bread can be promoted better to improve consumer acceptance. More research shows food security issues in North Luwu, Sulawesi. The UNDP reduced district residents' suffering in 2015. This UNDP program shows how much Indonesia needs dietary diversity, widely available everywhere. Diversity and balance on each plate at each meal explain this research's goal. Government and society collaborate to meet this essential need (Diansari & Nanseki, 2015). The supply chain in Figure 2 is designed to help explain cassava rice's appropriateness.

Figure 2's supply chain graphic has multiple interpretations. The arrows from left to right and down show how raw materials are ordered, processed, and sold. Red signifies that vocational colleges must be careful when cooperating with BULOG for raw materials. In addition, you must cooperate smartly with the lab throughout testing. Red represents essential places and processes outside higher education organizations' control and is crucial to creating trust and cassava rice's image. Green indicates that this image is ready for distribution to consumers and organizations like

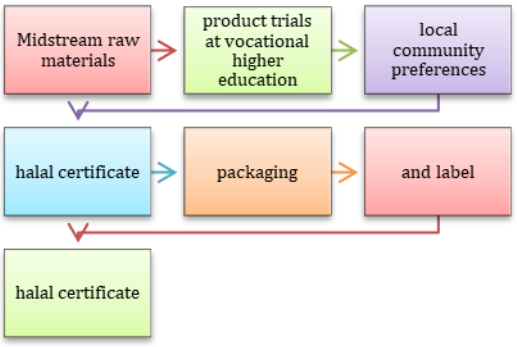


*Figure 2. designed to help explain cassava rice's appropriateness*

government agencies and enterprises.

## 4. CONCLUSION

Rice must have competition, as discussed above. Cassava substitution is optimal since it is efficient and supported by mid-stream to downstream supply chain logistics. Packaged rice with Indonesian-style variants must have a halal certificate to be accepted. In addition, product titles should reflect millennial and next-generation tastes, such as new fried rice, teriyaki chicken rice, and others. Thus, (1) cassava rice can be compared to rice because balanced portion space is still possible, and (2) if packaged according to probable consumers' likes and proclivities, it can compete with rice. This research must continue with cooking, packaging, and laboratory tests to verify nutritional content. Clinical research requires product trials and preferences. MSMEs, startup enterprises, and colleges in this discipline should take advantage of this opportunity.

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