

Engineering Design (MEBULOG) Machine Analog Rice Maker Based on Flour Breadfruit as a Solution for Food Security Through Food Diversification and Exploration Alternative

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1; 2; 3; 4; 5;

Abstract

Background - Background of the Document: This document outlines the progress report of the MEBULOG project (Analog Rice Maker Machine), designed to support food diversification in Indonesia. The background highlights the increasing rice imports that impact national food security, necessitating alternatives to reduce dependency on conventional rice. MEBULOG was developed to produce analog rice from breadfruit flour, a nutritious local ingredient that can serve as a solution for healthy and environmentally friendly food needs. This machine is designed for ease of use, portability, and production capacity flexibility. The program's primary targets are household industries, SMEs, and government institutions that support food diversification. This machine also addresses several health issues, such as the risk of diabetes, gluten allergies, and the need for low-calorie diets. Additionally, the project has developed marketing strategies through social media, collaborations with influencers, and e-commerce to expand market reach. The project is supported by training, research, and collaboration with various parties, including universities, laboratories, and digital marketing platforms, to ensure success in product development and its market achievements.

Purpose - The purpose of the MEBULOG (Analog Rice Maker Machine) project is to support Indonesia's food security efforts by promoting food diversification and reducing dependency on conventional rice. This project aims to address the challenges of rising rice prices and scarcity by introducing analog rice made from breadfruit flour, a nutritious and sustainable local ingredient. Through the development of the MEBULOG machine, the project seeks to simplify the production process, making it accessible and user-friendly for small businesses, households, and other stakeholders.

methodology - Design/Methodology/Approach of the MEBULOG Project: The MEBULOG project employs a comprehensive design, methodology, and approach to ensure the successful development and implementation of its analog rice-making machine. The design emphasizes a compact, portable, and user-friendly structure to make the machine accessible for a wide range of users, including small businesses, households, and researchers. The functionality of the machine incorporates automated processes such as grinding, shaping, and cutting to achieve consistency in the size, texture, and quality of the analog rice produced. The methodology involves rigorous research and development to determine the optimal specifications for both the machine and the product. Breadfruit flour is selected as the main ingredient, combined with tapioca as a binding agent, to create a nutritious and sustainable alternative to conventional rice. The prototype underwent iterative testing to ensure performance efficiency, reliability, and ease of operation. Market analysis was conducted to identify target consumers, such as health-conscious individuals and small-scale producers, and to develop strategies for effective market entry. The approach prioritizes collaboration and education. Partnerships with universities, laboratories, and entrepreneurs were established to enhance product testing, knowledge exchange, and innovation. Consumer education campaigns were implemented to raise awareness about the health benefits and sustainability of analog rice, addressing misconceptions and encouraging adoption. Marketing efforts were strategically planned through digital platforms, social media, and collaborations with health influencers to expand market reach.

Findings - The development and implementation of the MEBULOG (Analog Rice Maker Machine) project revealed several significant insights. The machine successfully automated the production process of analog rice, ensuring consistent quality in terms of size, texture, and shape. Its compact and portable design made it an appealing option for small-scale producers and households, as it did not require specialized training to operate. However, while the machine performed well in controlled environments, further adjustments were needed to optimize energy efficiency and improve long-term durability under continuous use. The analog rice produced from breadfruit flour received positive feedback due to its health benefits, particularly its low glycemic index, low-calorie content, and suitability for people with gluten sensitivity or diabetes. Despite this, the market response was initially slow, as many consumers were unfamiliar with the concept of analog rice and required education on its benefits. This highlighted the need for more extensive consumer outreach and education to build trust and acceptance of the product.

Originality - The MEBULOG (Analog Rice Maker Machine) project brings a unique and valuable contribution to both the food innovation and sustainability sectors in Indonesia. The originality of the project lies in its use of breadfruit flour, a local and underutilized resource, as the key ingredient for producing analog rice. This innovative approach not only addresses food security concerns but also promotes the use of sustainable, nutrient-rich alternatives to conventional rice. By offering a product with a low glycemic index and reduced calorie content, MEBULOG meets the growing consumer demand for healthier food options, especially for those managing conditions like diabetes or those following gluten-free or low-calorie diets.

Keywords: analog rice, breadfruit flour, mebulog machine, food diversification
