IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, July 2025
Impact Factor: 7.67

Solar Powered 3 in 1 Food Grade Processor

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Abstract: *This study highlights the development and validation of a solar-powered 3-in-1 food-grade processor designed to perform cassava grinding, coconut grating, and juice pressing—all in a single, compact system. It aims to improve food processing in off-grid and rural communities by combining stainless steel components, a 1 HP and 120-watt electric motor, and a solar power setup that includes photovoltaic panels, a hybrid inverter, and a lithium-ion battery. Using a developmental-descriptive research design, the project was evaluated through the Department of Science and Technology's Technology Assessment Protocol (TAP), focusing on the TEEPS criteria: Technical, Economic, Environmental, Political, and Social viability. The fabrication process involved precision machining and the use of food-safe materials to ensure both safety and durability. Evaluation results showed very high acceptability in terms of technical performance, affordability, ease of maintenance, and environmental sustainability. Performance trials confirmed the processor's efficiency in handling both cassava and coconut, with reliable solar energy harvesting across different weather conditions. Feedback from stakeholders also emphasized the device's cultural appropriateness, gender inclusivity, and its potential to reduce reliance on fossil fuels. Overall, the findings confirm that the solar-powered 3-in-1 processor is a practical and sustainable innovation for rural food processing. A comprehensive user manual was also created to support proper operation, maintenance, and safety. This project contributes meaningfully to the promotion of renewable energy, food safety, and technology-driven empowerment in underserved agricultural communities*

Keywords: Food Processing, Solar Powered,Renewable Energy, Durability, Safety

DOI: 10.48175/IJARSCT-28331