

**DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF
COCONUT HUSK AND SHELL BIOMASS-FED OVEN**

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ABSTRACT

CABALLONG, JEMIMAH L. AND DIOSES, CALVIN KIM M., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **June 2023, DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF COCONUT HUSK AND SHELL BIOMASS-FED OVEN.**

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This study focused on the design, fabrication, and performance evaluation of a coconut husk and shell biomass-fed oven for commercial and household baking. It aimed to utilize coconut bio-wastes and biomass fuel efficiently. The oven's design, heat distribution, and economic viability were assessed, comparing it with a conventional gas oven. The coconut husk and shell biomass-fed oven, designed with functionality and user-convenience in mind, enabled the baking of 8.4-kg coconut pies per batch. It showcased efficient heat distribution, maintaining a consistent baking temperature of 154.52°C. The oven utilized biomass fuel effectively, achieving a 100% baking efficiency. Compared with a conventional gas oven, the biomass-fed oven demonstrated similar baking characteristics offering sustainability advantages by utilizing renewable biomass fuel. Cost analysis demonstrated significant operating cost savings, resulting in a profitable return on investment despite the higher initial investment cost. This study contributed to the utilization of coconut bio-wastes, encouraged their use as biofuel, and offered valuable insights for future research on biomass-fed ovens as viable alternative for baking applications, promoting sustainability and reducing reliance on non-renewable fuels.

Keywords: oven, coconut husk, coconut shell, biomass-fed oven.

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