DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF MECHANICAL RICE STRAW CHOPPER CON MIXER

CHRISTINE NEIL C. MARIANO

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(AB Machinery and Power Engineering)

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ACCEPTANCE SHEET

This undergraduate thesis manuscript entitled **"DESIGN, FABRICATION AND ERFORMANCE EVALUATION OF MECHANICAL RICE STRAW CHOPPER CON MIXER,"** prepared and submitted by **CHRISTINE NEIL C. MARIANO,** in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (AB MACHINERY AND POWER ENGINEERING),** is hereby accepted:

ELIZA E. CAMASO, M.Sc.
Member, Advisory Committee

Date Signed

RUEL G. PENEYRA, M.Sc.
Member, Advisory Committee

Date Signed

NOVALYN G. DELOS SANTOS, M.Sc.
Chair, Advisory Committee

06-27-24
Date Signed

Accepted as partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (AB MACHINERY AND POWER ENGINEERING)**

JOHN PAULO C. SACDALAN, Ph.D.
Head, Department of Agricultural and Biosystems Engineering

Date Signed

ROY SEARCA JOSE P. DELA CRUZ, Ph.D.
Acting Dean, College of Engineering

Date Signed

BIOGRAPHICAL SKETCH

Christine Neil C. Mariano, born on April 19, 2001, in Cabanatuan City, Nueva Ecija, is the youngest child of Mr. Noel Mariano and Mrs. Nelia Mariano. Her parents are originally from Ilagan City, Isabela, and Ozamiz City, Misamis Occidental. Growing up in a military-disciplined environment, Christine inherited the values of dedication and hard work, witnessing the rigors of military training firsthand.

Neil began her educational journey at BC Achiever's Integrated Inc., where she built a strong academic foundation. She then attended St. Louis Anne Montessori High School and Colleges for her junior high school years, distinguishing herself as the Corps Commander of Citizenship Army Training and earning the title of Most Valuable Player in girls' basketball. Christine's versatility extended beyond the basketball court, as she won championships in badminton, darts, chess, and table tennis. Her leadership abilities were recognized with a prestigious leadership award.

For her senior high school education, Neil attended the College of the Immaculate Conception. She continued to excel as a student-athlete, participating in both basketball and badminton. Her commitment to community service and spiritual development was evident through her active involvement as a fully pledged alumna of Student Catholic Action.

Neil is currently pursuing a Bachelor of Science in Agricultural and Biosystems Engineering at Central Luzon State University. Her passion for sustainable agriculture and technological innovation drives her academic endeavors, blending her rural upbringing with a desire to advance agricultural practices and contribute to the development of sustainable solutions in the field.

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This thesis is the culmination of the collective efforts of many, and the researcher is humbled by the contributions of each individual who played a part, no matter how small, in bringing this work to fruition.

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ABSTRACT

MARIANO, CHRISTINE NEIL C. College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **July 2024**, **DESIGN, FABRICATION AND PERFORMANCE EVALUATION OF MECHANICAL RICE STRAW CHOPPER CON MIXER**

Adviser: NOVALYN G. DELOS SANTOS, M.Sc

The mushroom industry in the Philippines is experiencing growth due to the recognized nutritional and medicinal benefits of mushrooms. However, the manual preparation of mushroom growing substrate poses challenges in terms of labor intensity and costs. To address this, a study was undertaken to design and assess the performance of a mechanical rice straw chopper with a mixer tailored for the local mushroom industry.

The study aimed to mechanize the labor-intensive process of mushroom substrate production by designing and fabricating a rice straw chopper con mixer. The development process was detailed, involving the design and fabrication of the machine to address existing challenges. Performance metrics such as chopping and mixing efficiency, along with output capacity, were assessed using ANOVA and mean comparisons by LSD.

The study successfully addressed key operational challenges and achieved its objectives. It was determined that the machine operates at a maximum output of 283.67 kg/hr with an efficiency of 94.54%. A comparative analysis of manual versus mechanized methods revealed significant reductions in labor costs and an increase in substrate production when using the machine. Economic viability was affirmed through a comprehensive cost analysis.

Keywords: Mushroom industry; substrate preparation; rice straw chopper; mechanization

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