

**DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF  
COCONUT FIBER EXTRACTION MACHINE**



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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and  
Biosystems Engineering, College of Engineering, Central Luzon State  
University, Science City of Muñoz, Nueva Ecija, Philippines  
in Partial Fulfillment of the Requirements  
for the Degree of

**BACHELOR OF SCIENCE IN AGRICULTURAL  
AND BIOSYSTEMS ENGINEERING  
(AB Machinery and Power Engineering)**

**JULY 2024**


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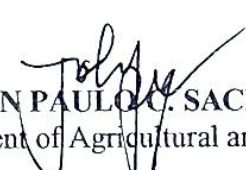
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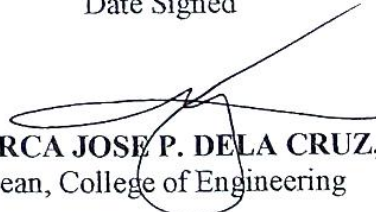
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**KRISTAL PEARL T. SINDAC**

## ACKNOWLEDGMENT

This thesis owes its completion and feasibility to the indispensable support and guidance provided by specific individuals who have offered the researchers encouragement, inspiration, moral support, and direction throughout this endeavor.

To Sir Ruel G. Peneyra, the assigned adviser of the researchers for his guidance, time, ideas, advice, and support in completing this thesis paper. His suggestions for improvements greatly contributed to enhancing this study.

To Sir Marlon T. Delos Santos and Sir Efren A. Dela Cruz, the committee members, for their suggestions and guidance, which were instrumental in making this research both possible and relevant.

The College of Engineering, Dr. Roy Searca Jose P. Dela Cruz, the Dean, and all faculty members and staff for teaching and shaping the researchers' skills and knowledge.

To the Friends and loved ones of the researchers, including Jerwin C. Jazmin, for the encouragement and support provided throughout their study.

To the respected guardians of the researchers, Mr. Carlo Bien C. Sindac, Mrs. Mary Chris T. Sindac, Mr. Domiandor R. Orpiano, and Mrs. Liezel R. Orpiano. Their unwavering support, guidance, words of wisdom, financial help, and inspiration were indispensable throughout this wonderful journey.

The researchers owe their achievements to their guardians' constant encouragement and motivation.

Above all, the Almighty God, who gave them everything that they have today, lest everyone in their lives be a part of their journey, to be a lesson and a support towards their success.

**THE AUTHORS**

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## ABSTRACT

**ORPIANO, JHAYZIEL R., SINDAC, KRISTAL PEARL T.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, July 2024, **DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF COCONUT FIBER EXTRACTION MACHINE**

Adviser: RUEL G. PENEYRA, M.Sc.

This study examines the Coconut Bristle Machine, designed to enhance productivity and efficiency in coconut processing. The machine includes an outer structure, electric motor, drawer, holder, residue cover, and rotating shaft, and was tested according to Philippine Agricultural Engineering Standard (PAES) 251:2011. Tests were conducted using coconut husks of different maturities at three speeds: 500 rpm, 800 rpm, and 900 rpm. Noise levels rose from 61.4-77.6 dB when idle to 74.5-84.9 dB during operation. Energy consumption was 0.234 kilowatt-hours, with power consumption at 811 watts, voltage at 220 volts, and current at 3.69 amps.

Fiber extraction duration varied with drum speed and husk maturity, from 9.013 minutes (young husks at 900 rpm) to 18.723 minutes (mature husks at 900 rpm). The highest fiber weight was 2.867 kg at 500 rpm with young husks, and the lowest was 1.817 kg at 900 rpm with mature husks. Moisture content ranged from 59.23% to 91.25%. Defibering capacity peaked at 185.22 g/min at 900 rpm with young husks, with the highest fiber recovery (77.49%) at 500 rpm with mature husks, and defibering efficiency at 75.01% at 500 rpm with mature husks.

The economic analysis shows an initial investment of ₱26,310.00 and an annual income of ₱6,411.25 ensuring quick payback and high ROI. These findings emphasize the importance of optimizing both the cylinder speed and the maturity level of the coconut husk to maximize fiber yield and quality during the extraction process.

The Coconut Bristle Machine represents hope, progress, and economic resilience for Aurora Province, promoting innovation and sustainability, and potentially transforming the coconut industry into a model of economic prosperity and environmental responsibility.

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