

**FABRICATION AND PERFORMANCE EVALUATION OF A BLADE-TYPE
COCONUT DEHUSKING MACHINE**

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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and
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in Partial Fulfillment of the Requirements
for the Degree of

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

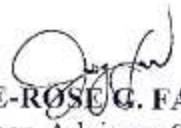
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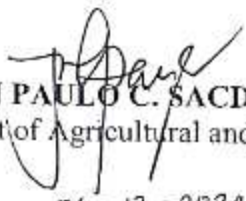

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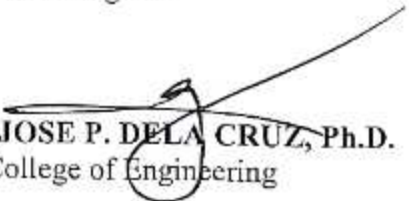

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BIOGRAPHICAL SKETCH

Rianne Grace S. Sagun, the second author, was born on October 31, 2001, in San Jose City, Nueva Ecija. She is recognized for her diligent and ambitious nature, consistently striving to make her parents proud. Currently, she resides in Brgy. Maligaya, Science City of Muñoz, Nueva Ecija. Rianne's education began at Maligaya Elementary School, where her outstanding academic achievements earned her a place among the top 10 students in their batch. She continued her studies at Muñoz National High School for her Grade 7 and Grade 8 and Grade 9 and 10 at Triala National High School. She enrolled at Sto. Domingo National Trade School for her Senior High School education. Throughout her Junior and Senior High School years, Rianne Grace pursued the Accountancy and Business Management (ABM) Academic Track, showcasing her broad interests and desire for a well-rounded education. Her dedication to learning and academic excellence earned her the distinction of achieving honors throughout her Junior and Senior High School years.

As Rianne Grace progressed in her educational journey, she developed a keen interest in mathematics and agriculture. This passion influenced her decision to pursue a Bachelor of Science in Agriculture and Biosystems Engineering, majoring in AB Machinery and Power Engineering, for her college studies.

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ABSTRACT

ESPAÑOLA, ANIE PEARL G., SAGUN, RIANNE GRACE S., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **MARCH 2023, FABRICATION AND PERFORMANCE EVALUATION OF A BLADE-TYPE COCONUT DEHUSKING MACHINE.**

Adviser: **JEFFREY A. LAVARIAS, Ph.D**

Coconut production is vital to the livelihoods of many communities in the Philippines, with dehusking being a crucial but labor-intensive process. This study aimed to develop and evaluate a blade-type coconut dehusking machine designed for small-scale farms, utilizing locally available materials and constructed in local manufacturing shops. The machine features nine main components, including a dehusking chamber, rollers, and an electric motor. Performance was tested on newly harvested mature coconuts using three sprocket configurations (12 teeth, 19 teeth, and 24 teeth), each tested in 45 runs to analyze dehusking time, capacity, efficiency, and coconut damage.

Results indicated that dehusking time was significantly influenced by sprocket teeth numbers, with 12 teeth (130 rpm) showing the fastest dehusking time. However, both 12 teeth and 24 teeth configurations demonstrated higher capacities (104 pcs/hr and 81 pcs/hr, respectively) compared to the 19 teeth configuration (79 pcs/hr). Efficiency analysis revealed no significant difference between 12 teeth and 24 teeth configurations (66.67% and 73.33%, respectively), both outperforming the 19 teeth configuration (53.33%). The 24 teeth configuration resulted in the lowest coconut damage (0%), while the 12 teeth and 19 teeth configurations showed higher damage rates (13.33%).

Power consumption analysis showed the 12 teeth configuration consumed 1.98 kW-hr without load and 2.156 kW-hr with load. The 19 teeth configuration consumed 2.2 kW-hr both without and with load, while the 24 teeth configuration consumed 2.2 kW-hr without load and 2.464 kW-hr with load. Economic analysis indicated a break-even point at 24,872 pcs/year; net income of Php 75,055/year, and a payback period of 1 year, demonstrating the machine's economic viability. These findings suggest that the developed dehusking machine offers a practical and efficient solution for small-scale coconut farmers, enhancing productivity and reducing labor costs in rural agricultural settings.

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