

**DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF
ONION (*Allium cepa* L.) BULB DESCALER**

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

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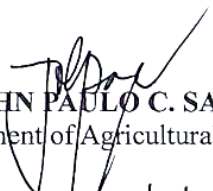

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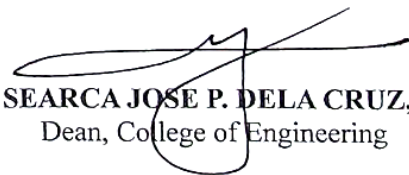

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BIOGRAPHICAL SKETCH

Ernest Rods L. Librea, 22 years old, was born on December 03, 2001, in Heart of Jesus, San Jose City, Nueva Ecija. He is the eldest son of Ingrid L. Librea & Joseph F. Librea, that resides in Purok 3, Bakal II, Talavera, Nueva Ecija.

He completed his primary education at Bakal II Elementary School, also known now as Bakal II Integrated School, where he was awarded an honorable mention. Furthermore, he finished junior high school at Sto. Domingo National Trade School (SDNTS) and Technical Vocational Education (TVE) in Drafting Technology. In senior high school, he finished his studies in a Science, Technology, Engineering, and Mathematics (STEM) strand at the same school where he finished his junior high school program. He was a consistent honor student until he graduated high school.

He pursued his bachelor's degree at Central Luzon State University (CLSU) and is currently enrolled in the Bachelor of Science in Agricultural and Biosystems Engineering (BSABE) program with a major in AB Machinery and Power Engineering as a senior student.

Ernest, inspired by his supportive aunt, persevered through the Bachelor of Science in Agricultural and Biosystems Engineering (BSABE) program. During his studies, he gained valuable practical experience through an on-the-job training (OJT) at the Agricultural Machinery Testing and Evaluation Center (AMTEC). This immersive experience allowed Ernest to apply his classroom knowledge to real-world scenarios focused on agricultural machinery. The OJT not only broadened his understanding of machine testing but also enabled him to establish professional networks and develop in a

encouraging work setting. Now, as a senior student, Ernest is poised to obtain his first degree, a testament to his dedication and the support he received along the way.

Upon graduation, he aspires to pursue a career in ABE field, together to pass the board exam, where he can continue to grow and make meaningful contributions. His long-term goals including continuous gaining knowledge day-by-day, and he is excited to embark on this next chapter of his professional journey.

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ABSTRACT

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Adviser: NOVALYN G. DELOS SANTOS, M.Sc.

This study focused on addressing the challenges faced by onion farmers in post-harvest operations, particularly in the effective removal of excess peel and dirt from onion bulbs. The primary objectives included designing, fabricating, and evaluating the performance of an onion bulb descaler machine, using locally sourced materials.

The results indicated that the machine achieved a peak descaling efficiency of 90.43% at 500 rpm, with minimal damage to the bulbs and a descaling loss of 9.63%. A cost analysis revealed an initial investment of PHP 45,016.20, a total annual cost of PHP 19,735.00, and a breakeven point of 7,853.85 kilograms per year, leading to a payback period of approximately 3.07 years.

Overall, the study successfully designed and fabricated an onion bulb descaler that effectively reduced post-harvest losses and labor costs for small-scale farmers, enhancing the efficiency of onion handling and improving the economic viability of onion farming in the country. To enhance the machine's effectiveness, it is recommended to further optimize its design parameters, conduct additional testing on other vegetable such as garlic, and, operate the brush rollers at a speed of 500 rpm. By implementing these recommendations, the onion bulb descaler can significantly improve post-harvest efficiency, reduce losses,

and increase profitability for onion farmers, ultimately contributing to the economic viability of onion farming in the Philippines.

Keywords: Onion Bulb Descaler, Descaler, Descaling Efficiency, Onion

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