

**DESIGN, FABRICATION, AND EVALUATION OF FOOD WASTE PULPER**

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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 Munoz, 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)**

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ACCEPTANCE SHEET

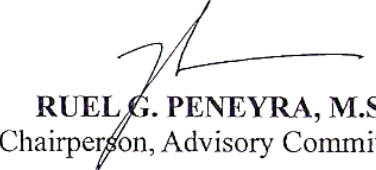
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## **BIOGRAPHICAL SKETCH**

Rica Ann E. Marin was born on April 12, 2001, in Malolos, Calumpit, Bulacan. She is the only child of Mr. Ricardo G. Marin and Mrs. Annie E. Marin. For her primary and secondary education, both junior and senior high school, she attended St. John the Baptist Catholic School, consistently demonstrating academic excellence and graduating with honors.

Rica Ann's academic journey continued in August 2020 when she enrolled at Central Luzon State University for tertiary education. There, she pursued a Bachelor of Science in Agricultural and Biosystems Engineering (BSABE), aligning with her passion for innovative solutions in agriculture and sustainable development.

**RICA ANN E. MARIN**

## **BIOGRAPHICAL SKETCH**

Cyrus Gaile V. Peralta was born on February 26, 2003, to Fernando T. Peralta and Annabel V. Peralta. Her academic journey commenced at Bagong Sikat Elementary School, where she laid a solid foundation for her future studies.

She pursued her secondary education at Muñoz National High School - Main, distinguishing herself through diligent coursework and a fervent enthusiasm for learning. Remaining at the same institution for senior high school, she focused on subjects integral to her pursuit of an engineering career.

Upon completing high school, Cyrus enrolled at Central Luzon State University to pursue a Bachelor of Science in Agricultural and Biosystems Engineering (BSABE). Her choice of major reflected a profound interest in sustainable agriculture and a commitment to effecting positive change in the field.

Cyrus Gaile V. Peralta's educational accomplishments underscore her dedication to excellence and her passion for agricultural and biosystems engineering. Her journey from Bagong Sikat Elementary School to Central Luzon State University exemplifies her perseverance, diligence, and the unwavering support of her family. As she advances in her career, Cyrus is poised to significantly contribute to the progression of agricultural practices and sustainability initiatives.

**CYRUS GAILE V. PERALTA**

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## ABSTRACT

**MARIN, RICA ANN E.** and **PERALTA, CYRYS V.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Munoz, Nueva Ecija, Philippines, **July 2024, DESIGN, FABRICATION AND EVALUATION OF FOOD WASTE PULPER**

Adviser: RUEL G. PENEYRA, M.Sc.

Food waste constitutes half of the Philippines' total waste, potentially causing environmental issues such as greenhouse gas emissions, flooding, and health problems if not managed properly. This research aimed to design, fabricate, and evaluate a food waste pulper suitable for processing food waste in densely populated areas. The machine mechanically breaks down food waste with water into fine particles, creating a slurry. It includes a hopper, a chamber housing the pulping plate, a perforated cylinder, blades, and a frame predominantly fabricated from stainless steel for its non-corrosive properties. The machine is capable of processing up to 184 kg of food waste per hour. To assess the machine's performance, three shaft speeds—735, 1422, and 1850 rpm—were tested in a completely randomized design layout. Data were collected and analyzed using analysis of variance at a 5% significance level. In terms of pulping efficiency, operating the food waste pulper at 1850 rpm demonstrated significantly higher performance, achieving a mean efficiency of 99.93%, compared to 99.55% and 98.87% at 1422 rpm and 735 rpm, respectively. This indicates that higher shaft speeds improve the efficiency of food waste pulping. By demonstrating its ability to effectively manage food waste, this study confirms the pulper's potential for broader practical application in densely populated areas.

Keywords: *Food waste; food waste pulper; Pulping efficiency*

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