

**PERFORMANCE EVALUATION OF CENTRAL LUZON STATE UNIVERSITY
(CLSU) SUNFLOWER (*Helianthus annuus* L.) DEHULLER**

BIEN ANJHELLO S. LIM


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ACCEPTANCE SHEET


This undergraduate thesis entitled “**PERFORMANCE EVALUATION OF CENTRAL LUZON STATE UNIVERSITY (CLSU) SUNFLOWER (*Helianthus annuus* L.) DEHULLER,**” prepared and submitted by **BIEN ANJHELLO S. LIM**, 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:


JOHN VINCENT A. NATE, M.Sc.
Member, Advisory Committee


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

Date Signed


Date Signed


ROLDAN T. QITOS M.Sc.
Chair, Advisory Committee

Date Signed


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


ELMAR M. VILLOTA, Ph.D.
Chair, DABE


JOHN PAULO C. SACDALAN, Ph.D.
Department Research Coordinator

Date Signed

Date Signed


THEODY B. SAYCO, Ph.D.
Dean, College of Engineering

Date Signed

BIOGRAPHICAL SKETCH

Bien Anjhello Santos Lim was born in San Miguel, Bulacan on July 2, 2001. He is the eldest of Jonathan G. Lim and Angelita S. Lim's four children. He finished elementary at Park Ridge School of Montessori in San Miguel, Bulacan, as the second honorable mention, artist of the year, and a leadership awardee. He enrolled in San Miguel National High School in 2013, completing Junior High School in 2017. He studied Science, Technology, Engineering, and Mathematics in Senior High School, where he graduated in 2019 with academic honors and distinction in research and capstone projects. He was part of the formidable organizations at Central Luzon State University such as the Engineering Computer Club (ECC), University Supreme Student Council (USSC), and Student Development, Initiatives, and its Appropriations Committee as he pursued his bachelor's degree in the said University under the Agricultural and Biosystems Engineering program, majoring in AB Power and Machinery Engineering, and is expected to graduate on July 2023.

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ABSTRACT

LIM, BIEN ANJHELLO S., Department of Agricultural and Biosystems Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **JUNE 2023, PERFORMANCE EVALUATION OF CENTRAL LUZON STATE UNIVERSITY (CLSU) SUNFLOWER (*Helianthus annuus* L.) DEHULLER.**

Adviser: Roldan T. Quito, M.Sc.

Sunflower is a widely cultivated oilseed crop in temperate and subtropical regions, including the Philippines. Producing sunflower seed products involves several processes, with dehulling being a critical post-harvest operation to obtain hull-free kernels. This study highlights the significance of the centrifugal sunflower dehuller machine, addressing design and performance challenges and outlining future research directions. Performance metrics for the dehuller include dehulling capacity (input and output), dehulling efficiency, cleaning efficiency or purity, hulling recovery, and noise level.

Using a Box Behnken Design (BBD) with a 2^3 -factorial, seventeen (17) test runs were conducted to evaluate the machine's performance across varying dehulling clearances, RPM, and feeder opening settings. The optimization process employed Response Surface Methodology (RSM) to maximize dehulling capacity, efficiency, hulling recovery, and cleaning efficiency, while minimizing noise levels, ensuring high yield and quality of dehulled seeds along with a safer working environment.

The optimization yielded thirty-six (36) potential solutions, with the optimal set-up achieving the highest desirability factor of 0.779. The optimal parameters were a dehulling clearance of 2.29 mm, RPM of 65, and feeder opening of 47.56 mm. At these settings, the machine achieved an input dehulling capacity of 112.89 kg/h, output dehulling capacity of

21.82 kg/h, dehulling efficiency of 70.62%, cleaning efficiency of 55.71%, hulling recovery of 55.72%, and a noise level of 94.73 dB. These results demonstrate that precise optimization of operational parameters significantly enhances the machine's performance, producing a high yield of clean, intact sunflower seeds while maintaining acceptable noise levels. This study emphasizes the importance of optimization in improving the efficiency and effectiveness of the sunflower dehulling process.

Keywords: sunflower, dehuller, sunflower seeds, sunflower dehulling machine, performance evaluation, machinery

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