

**COMPREHENSIVE SEMESTRAL REPORT AT CENTRAL LUZON STATE  
UNIVERSITY - CENTER FOR RENEWABLE ENERGY AND  
TECHNOLOGY (CLSU-CREaTe)**

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An Undergraduate Comprehensive Semestral Report 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 in Partial Fulfillment of  
the Requirements for the Degree of

**BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS  
ENGINEERING  
(Agricultural Power, Energy, and Machinery Engineering)**

**MAY 2024**

ACCEPTANCE SHEET

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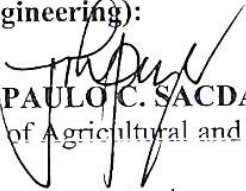
  
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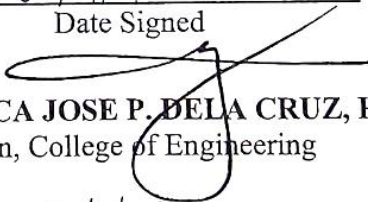
  
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## **BIOGRAPHICAL SKETCH**

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## ABSTRACT

**GAMBITO, JERAMIE M.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **May 2024, COMPREHENSIVE SEMESTRAL REPORT ON FIELD PRACTICE AT CENTRAL LUZON STATE UNIVERSITY - CENTER FOR RENEWABLE ENERGY AND TECHNOLOGY (CLSU-CREaTe)**

Adviser: **MARLON T. DELOS SANTOS, M.Sc.**

The field practice was conducted at Central Luzon State University - Center for Renewable Energy and Technology (CLSU-CREaTe) located at CLSU compound, Science City of Muñoz, Nueva Ecija from October to December 2023 and March to May 2024.

The field practice Activity 1 aimed to evaluate a 250L semi-automated bioreactor using AC and solar powered source. The specific objectives of this activity were to: 1) perform an evaluation of semi-automated bioreactor using AC and solar powered source; 2) determine the fermentation efficiency of the semi-automated bioreactor using AC and solar powered source; and, 3) comparison of power consumption of AC and solar powered source

The field practice activity 2 aimed to design an 800L tank capacity of bioethanol distiller. The specific objectives of this activity were to: 1) determine the optimum area and height of an 800L tank capacity bioethanol distiller; 2) determine the other components of the bioethanol distiller; 3) layout a design of a bioethanol distiller; and, 4) prepare a bill of materials of the bioethanol distiller.

The field practice activity 3 aimed to perform other activities. The specific objective of this activity were to: 1) perform other activities that will be assigned by the

director of center, the supervisor of student-trainee or any CLSU-CREaTe personnels; and, 2) promotes the student's readiness and flexibility in their respective specialization.

The 250L semi-automated bioreactor was evaluated for fermentation efficiency using AC and solar power sources. The results showed a fermentation efficiency of 81.7% and 83.5%, respectively. The AC source consumed 6.25 pesos, while solar power sustained the entire fermentation process of molasses.

The bioethanol distiller's design, which holds a capacity of 800L includes a tank, reflux column, primary condenser, slanted secondary condenser, vertical secondary condenser, and frame. The final dimensions were calculated to ensure the machine's efficiency and durability.

Moreover, the student-trainee gained familiarity with several aspects of renewable energy, including participation in events, conducting machine assessment tests, and engaging in equipment assembly during field practice time frame.

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