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 MECHANIZATION AND RENEWABLE ENERGY)

JULY 2024

ACCEPTANCE SHEET

This field practice manuscript entitled, "**COMPREHENSIVE SEMESTRAL REPORT AT CENTRAL LUZON STATE UNIVERSITY - CENTER FOR RENEWABLE ENERGY AND TECHNOLOGY (CLSU-CREaTe)**" prepared and submitted by **ANJOHN M. ADOR DIONISIO** as partial fulfillment of the requirements for the degree **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (AGRICULTURAL MECHANIZATION AND RENEWABLE ENERGY),** is hereby accepted:

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BIOGRAPHICAL SKETCH

Anjohn M. Ador Dionisio was born on the 19th day of July 1998 in Cabanatuan City, 25 years of age. He is the youngest child among three children of Celso E. Ador Dionisio and Edith M. Ador Dionisio. He has a brother, namely Anthony, being the oldest. And a sister, namely Anneth, being the middle child. He is from Camella Nueva Ecija, Valle Cruz, Cabanatuan City, Nueva Ecija.

Anjohn accomplished his primary education in March 2011 at Cabanatuan East Central School (CECS) and Secondary Education in March 2015 at Honorato C. Perez Sr. Memorial Science High School (HCPSMSHS), both located in Cabanatuan City, Nueva Ecija. He is an Agricultural and Biosystems Engineering student at Central Luzon State University (CLSU) major in Agricultural Mechanization and Renewable Energy.

Anjohn loves to spend time with his significant other, Mariel. He also loves to stay at home watching movies and playing games. In his spare time and free time, he likes to clean the house, and the car of his father, as that car is important to his father.

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ABSTRACT

ADOR DIONISIO, ANJOHN M., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **June 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.

The field practice Activity 1 aimed to evaluate a 250L semi-automated bioreactor using AC and solar-powered source. The objectives of this activity were to 1) evaluate the 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 objectives 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) promote 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% for the AC which consumed 6.25 pesos, and 83.5% for solar power source. The fermentation efficiency is almost identical however, using solar-powered source saves money than using AC. But, the initial cost to build the solar-powered source is much greater.

The bioethanol distiller's design, which holds a capacity of 800L, has been up-scaled to a larger size. The design 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 gained experience with several aspects of renewable energy. The student participated in events, conducting and evaluating machines, and engaging in equipment assembly, which are all agricultural and biosystems-related tasks during the time frame of the field practice.

Keywords: bioreactor, evaluation, distiller, designing

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