

**VALIDATION OF CO₂ HARVESTER IN GREENHOUSE FROM
PHOTOCATALYTIC DECOMPOSITION OF
AGRICULTURAL WASTES**

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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)**

JULY 2024

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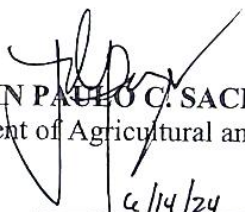

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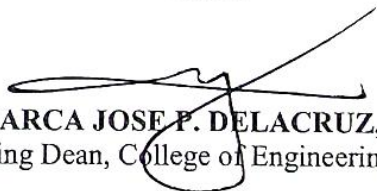

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BIOGRAPHICAL SKETCH

The author, Mel John Velasco Sumait, was born on March 21, 2001, in Urdaneta City, Pangasinan, and raised in a small barangay in the Municipality of Maria Aurora, Aurora, where he currently lives. He is the third child of Mr. Melecio Rabina Sumait and Mrs. Gina Velasco Sumait. He grew up with a simple way of life, having a farmer father and a mother who ran a small sari-sari store.

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ACKNOWLEDGEMENT

The researcher would like to extend his sincere gratitude and appreciation to all the multiple individuals who provided their invaluable support, words of wisdom, and resources for the completion of this study. To them, the author is forever profoundly grateful.

To his thesis adviser, **Engr. Roldan T. Quito**s, whose profound expertise, patience, guidance, and unwavering support were instrumental throughout the research process from beginning until the end,

To his thesis committees, **Dr. Danila S. Paragas** and **Engr. John Vincent A. Nate**, for their valuable insights and constructive feedback that significantly improve the quality of the study,

The researcher extends his deepest appreciation to **Dr. Luzviminda S. Quito**s, for sharing her knowledge and for providing support and suggestions to make this study possible,

To his classmates, for being the reason for making this college bearable, their unwavering support and guidance are truly incomparable,

To his friends, **Eloisa**, **Lian Dhei**, **Shalemar**, **Lavern Josh**, **Rochelle**, and to those who failed to mention, for their assistance and continued support, who encourages the researcher to continue and finished the study,

To his best friend, **Jomel I. Pueblos** for his assistance and for providing a helping hand in time of need. For his kind heart that always encourages the researcher to continue. His love, support, and effort accompany him throughout the study. The appreciation was

extended to his family, Mama **Emy Pueblos**, for her unending help and guidance, the researcher is forever indebted to them,

To **Ms. Catherine Bianca Siapno**, for her support and endless words of encouragement, her generosity for lending print materials to the researcher all throughout the study.

To his family, especially his mom **Gina V. Sumait**, for their unending love and unwavering support and words of encouragement, throughout this academic pursuit. Their steadfast belief in the researchers' abilities has been a constant source of inspiration and motivation,

To his late dad, **Melecio R. Sumait**, for being an endless source of strength and determination. The researcher dedicates this success to him.

To his brother, **Mac Jayson V. Sumait**, and his uncle **Armando Velasco** for financially supporting the researcher in all the expenses he has been through. The researcher is always and forever thankful to them,

Above all, to The **Almighty God**, all the researcher's success was because of Him. No words can define how thankful he is.

The researcher recognizes that completing this thesis represents not only a personal achievement but also a collective endeavor marked by the contributions and support of countless individuals. Their collective wisdom, guidance, and encouragement have been instrumental in pursuing knowledge and academic excellence. Without them, this study would not be possible.

MEL JOHN V. SUMAIT

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ABSTRACT

SUMAIT, MEL JOHN VELASCO., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz Nueva Ecija, Philippines, **June 2024. VALIDATION OF CO₂ HARVESTER IN GREENHOUSE FROM PHOTOCATALYTIC DECOMPOSITION OF AGRICULTURAL WASTE.**

Adviser: ENGR. ROLDAN T. QUITOS, M.Sc.

Agricultural waste, including Corn cobs, rice straw, and chicken manure, are common agricultural waste in the Philippines. In this study, it was used as a bioresource material for photocatalysis. The mixture of agricultural waste with titanium dioxide was put inside the 1000L capacity IBC tank for decomposition and production of concentrated carbon dioxide. It was placed under direct sunlight for faster decomposition and UV light was installed for a continuous process at night.

The optimum performance of CO₂ harvester was evaluated at different parameters, which includes, temperature, daily CO₂ produced, volume of CO₂ produced, and flowrate. For validation, the CO₂ Harvester were installed in the greenhouse and the CO₂ injected were evaluated based on the carbon dioxide condition after injection. A CO₂ sensor were used to monitor the amount of CO₂ concentration inside the greenhouse.

As a result, the total volume of carbon dioxide collected was 195L, 178 liters under sunlight conditions while 17 liters under UV light conditions. Which concludes that the production under UV light conditions is not as effective compared to sunlight. The CO₂ collected was then injected inside the greenhouse trough drip irrigation for 3 minutes at 6:00 AM. A CO₂ sensor were used to monitor the amount of CO₂ concentration inside the greenhouse. The highest collected data of concentration was 537 ppm and the lowest is 400

ppm. The study shows that the used of CO₂ harvester inside the greenhouse can boost carbon dioxide that helps the production and growth of plants through photosynthesis.

Keywords: CO₂ Harvester; carbon dioxide; CO₂ sensors; photocatalysis; greenhouse

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