DEVELOPMENT OF AN AUTOMATED MUSHROOM PASTEURIZING MACHINE

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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and Biosystem Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, 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

ACCEPTANCE SHEET

This undergraduate thesis entitled **"DESIGN FABRICATION AND DEVELOPMENT OF AUTOMATED MUSHROOM PASTEURIZING MACHINE,"** prepared and submitted by **ALYSSA MAE C. MENDOZA and KHARL AIDAN D. RAYO**, in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEM ENGINEERING (AB Machinery and Power Engineering)**, is hereby accepted:

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BIOGRAPHICAL SKETCH

Kharl Aidan D.C. Rayo was born on April 16, 2002, in Mallorca, San Leonardo, Nueva Ecija, as the second of three children to Mrs. Annalie D.C. Rayo and Victor P. Rayo. His academic journey began at San Lorenzo Ruiz Diocesan Academy, where he completed his elementary education in the 2011-2012 school year. He then transferred to Our Lady of Fatima University, Cabanatuan Campus, for his secondary education, graduating in the 2019-2020 academic year.

He decided to continue his studies at Central Luzon State University, pursuing a Bachelor of Science degree in Agricultural and Biosystems Engineering, a field that aligns with his passion and his family's business Despite facing challenges in college due to being a slow learner, he remains determined and dedicated to overcoming obstacles. He constantly strives to learn new things and enhance his skills to contribute meaningfully to his field and society, guided by his favorite verse, Philippians 4:6: "Worry about nothing; pray about everything."

He also aims to start a successful business related to his field and invent solutions to address the challenges faced by farmers and communities. He believes that by applying passion and giving his all to everything he does, he can achieve his goals.

BIOGRAPHICAL SKETCH

Alyssa Mae C. Mendoza was born on August 13, 2001, in Cabanatuan City, Nueva Ecija. She was raised in a simple, happy, and God-fearing family. She is the first daughter of Mrs. Rochelle C. Mendoza and Mr. Referendo D. Mendoza.

She completed her secondary education at Carranglan National High School in 2018. After graduation, she continued her studies at St. Joseph School of San Jose City, Nueva Ecija, where she graduated in 2020.

She pursued a bachelor's degree at Central Luzon State University, majoring in Agricultural and Biosystems Engineering.

Her college life was well spent and full of challenging lessons that molded her into an educated person. Those years helped her build strong friendships with individuals who became her inspiration during her ups and downs. Her college experience was also fruitful because Ms. Mendoza was able to develop her capabilities and make her dreams possible.

ACKNOWLEDGMENT

The researchers would like to extend their deep appreciation to everyone who kindly gave their time, support, and knowledge, making this study possible.

First and foremost, profound appreciation to their Thesis Adviser, Engr. Novalyn G. Delos Santos, for her vital leadership, guidance, and consistent support throughout the duration of this study. Her abilities and dedication have been key in setting the route of the study, offering essential feedback, and providing major discoveries.

Special thanks to Dr. Wendy C. Mateo and Dr. Marvin M. Cinense for their time and assistance in offering suggestions, comments, and recommendations.

Gratitude is also extended to the Dean of the College of Engineering, Dr. Roy Searca Dela Cruz, for his continued support and guidance to the students.

To their family, especially their parents, sincerest appreciation for their continuous support, both emotional and financial. Their support and advice have been priceless in negotiating the challenges faced throughout this study.

They also extend their gratitude to their friends for their never-ending support and understanding has been a source of strength along this journey.

Above all, thankfulness is extended to Almighty God for His blessings, strength, wisdom, and inspiration during this remarkable journey. This piece serves as an homage to the grace that has illuminated the path.

The researchers extend their gratitude to everyone who has played a role, no matter how large or small, in bringing this study to its conclusion. Through the peaks and lows of this journey, their support added a rich layer to the experience, making the challenges more bearable and the victories more joyous.

This thesis is a testament to the collective efforts of all those mentioned above. Sincere thanks are extended to everyone for being an integral part of this academic milestone.

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ABSTRACT

RAYO, KHARL AIDAN D., MENDOZA, ALYSSA MAE C., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **JULY 2024, DESIGN FABRICATION AND DEVELOPMENT OF AUTIOMATED MUSHROOM PASTEURIZING MACHINE**

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As one of the high valued crops in the world, mushroom production for both commercial and research purposes starts to grow. The purpose of this research work was to design, fabricate, and automate a mushroom pasteurizer under Arduino-platformed control systems. Through optimization of the mentioned pasteurization parameters—temperature, relative humidity, the box-like design of the pasteurizer had dimensions 1000 mm × 1000 mm × 1300 mm, with a capacity to hold 125 mushroom fruiting bags, and was fitted with an Arduino-based controller to maintain set conditions within it.

Conducted at the College of Engineering Farm, Central Luzon State University (CLSU), researchers enhanced traditional pasteurization methods by adding a temperature and humidity controller. Sensors ensured consistent temperature and humidity distribution, achieving optimal ranges of 90-96 degrees Celsius and 93-96% relative humidity.

The study examined the effects of three pasteurization durations (4, 6, and 8 hours) on mushroom growth. Findings showed that an 8-hour pasteurization period yielded the best results, with the lowest contamination rate of 14.4% and the longest colonization averaging 14.8 cm over three weeks. The developed system, incorporating an ESP board, heating coils, and relays, successfully automated the pasteurization

process, improving efficiency and consistency in mushroom production.

Keywords: Pasteurize, Temperature, Relative Humidity, Mushroom

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