DEVELOPMENT OF REMOTE REGULATING SYSTEM WITH AUTOMATIC WATER MISTING FOR OYSTER MUSHROOM *(Pleurotus ostreatus)* PRODUCTION

ABELARDO H. CARINGAL
MARC ANTHONY D. JIMENEZ

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 Muñoz, Nueva Ecija, Philippines
in Partial Fulfillment of the Requirements
for the Degree of

BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING
(AB Land and Water Resources Engineering)

JUNE 2023

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDIX

LIST OF APPPENDIX TABLES

LIST OF APPENDIX FIGURES

ABSTRACT

CARINGAL, ABELARDO HOLGADO and JIMENEZ, MARC ANTHONY DE GUZMAN, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines **DEVELOPMENT OF REMOTE REGULATING SYSTEM WITH AUTOMATIC WATER MISTING FOR OYSTER MUSHROOM *(Pleurotus ostreatus)* PRODUCTION**

Adviser: WENDY C. MATEO PhD.

An automatic temperature and humidity regulating is a system that combines the necessary hardware, including temperature and humidity sensor units, SMS Cellular Network, and Arduino as CPUs, to realize the simulation of creation.

This study was conducted to develop the system in situ and determine the performance of regulating system with automatic water misting. The system software is created to use C as the programming language. The system is incorporated with sim card for text message commands and DHT11 sensor with water misting. Environmental parameters such as temperature and humidity inside the growing house were gathered. The white oyster mushroom parameters such as cap diameter, stalk length, cap counts, color and yield were evaluated.

Based on the result of the study the developed remote regulating system with automatic water misting has significant effect towards the yield and quality of white oyster mushroom production. The controlled set-up temperature is significantly lower compared to conventional set-up. Humidity level is significantly lower in controlled set-up than conventional as well. In the long run utilizing regulating system with automatic water misting helps to minimize work time and labor for white oyster mushroom cultivation.

Keywords: White oyster mushroom, remote regulating system, misting system.

LITERATURE CITED

Anamosa. (2021). *Common Problems With Growing Oyster Mushrooms.*

Anta, D. K., Sandra, & Hendrawan, Y. (2021). Neuro-fuzzy humidity control for white oyster mushroom in a closed plant production system. *IOP Conference Series: Earth and Environmental Science*, *905*(1), 012066. https://doi.org/10.1088/1755-1315/905/1/012066

Ashgriz, N. (2011). Handbook of Atomization and Sprays. In *Handbook of Atomization and Sprays*. Springer US. https://doi.org/10.1007/978-1-4419-7264-4

Beetz, A., & Greer, L. (1999). *ATTRA // MUSHROOM CULTIVATION AND MARKETING.*

Bellettini, M. B., Fiorda, F. A., Maieves, H. A., Teixeira, G. L., Ávila, S., Hornung, P. S., Júnior, A. M., & Ribani, R. H. (2019). Factors affecting mushroom Pleurotus spp. *Saudi Journal of Biological Sciences*, *26*(4), 633–646. https://doi.org/10.1016/j.sjbs.2016.12.005

Bergman, T. L., Lavine, A. S., & Incropera, F. P. (2011). *Introduction to Heat Transfer.*

Chitra K., Sathyaparvathavarthini B., Mahalakshmi S., Kamalii R., Sharavanan P.T., Balisasikumar C., & Dhanalakshmi K. (2018). Effect of Abiotic Factors on Oyster Mushroom Production (Pleurotus Species). *International Journal of Current Microbiology and Applied Sciences*, 7(07), 1032–1036.

Chu, X., Cui, X., & Li, D. (2013). Remote Monitoring and Control of Agriculture. In *AISC* (Vol. 191).

Cikarge, G. P., & Arifin, F. (2018). Oyster Mushrooms Humidity Control Based On Fuzzy Logic By Using Arduino ATMega238 Microcontroller. *Journal of Physics: Conference Series*, *1140*, 012002. https://doi.org/10.1088/1742-6596/1140/1/012002

Faber T. E. (1995). *Fluid dynamics for physicists.*

Girmay, Z., Gorems, W., Birhanu, G., & Zewdie, S. (2016). Growth and yield performance of Pleurotus ostreatus (Jacq. Fr.) Kumm (oyster mushroom) on different substrates. *AMB Express*, *6*(1), 87. https://doi.org/10.1186/s13568-016-0265-1

Hamed, H. A., Mohamed, M. F., Hosseny, M. H., & El-Shaikh, K. A. A. (2021). Intercropping with Oyster Mushroom (Pleurotus columbinus) Enhances Main Crop Yield and Quality. *IOP Conference Series: Earth and Environmental Science*, *690*(1), 012028. https://doi.org/10.1088/1755-1315/690/1/012028

Hamonangan Nasution, T., & Yasir, M. (2019). *Designing an IoT system for monitoring and controlling temperature and humidity in mushroom cultivation fields.*

Hoa, H. T., & Wang, C.-L. (2015). The Effects of Temperature and Nutritional Conditions on Mycelium Growth of Two Oyster Mushrooms (*Pleurotus ostreatus* and *Pleurotus cystidiosus*). *Mycobiology*, *43*(1), 14–23. https://doi.org/10.5941/MYCO.2015.43.1.14

Jo, W.-S., Cho, Y.-J., Cho, D.-H., Park, S.-D., Yoo, Y.-B., & Seok, S.-J. (2009). Culture Conditions for the Mycelial Growth of *Ganoderma applanatum*. *Mycobiology*, *37*(2), 94. https://doi.org/10.4489/MYCO.2009.37.2.094

LaVia. (2021, May 20). *How and When Do You Harvest Mushrooms?* Canabis.Net.

Malone M. (2022, March 15). *Temperature & Humidity for Mushroom Growth*. Ehow.

MycoMedica d.o.o. (2023). *White Oyster Mushroom*. GOBA.

Nongthombam, J., Kumar, A., & Patidar, S. (2021). *A REVIEW ON STUDY OF GROWTH AND CULTIVATION OF OYSTER MUSHROOM A REVIEW ON STUDY OF GROWTH AND CULTIVATION OF OYSTER MUSHROOM View project*. https://www.researchgate.net/publication/349238624

Park, H., Roh, J., Oh, K. cheol, Cho, H., & Kim, J. (2022). Modeling and optimization of water mist system for effective air-cooled heat exchangers. *International Journal of Heat and Mass Transfer*, *184*, 122297. https://doi.org/10.1016/j.ijheatmasstransfer.2021.122297

Sace, C. F., & Natividad, E. P. (2015). Economic Analysis of an Urban Vertical Garden for Hydroponic Production of Lettuce (Lactuca sativa)* Global tilapia markets and development View project Indoor vertical farming systems View project Economic Analysis of an Urban Vertical Garden for Hydroponic Production of Lettuce (Lactuca sativa)*. In *International Journal of Contemporary Applied Sciences* (Vol. 2, Issue 7). www.ijcas.net

Sayner A., & Jong E. (2009). *A complete Guide to Oyster Mushrooms.* . GroCycle.

Sher, H., Al-Yemeni, M., Bahkali, A. H. A., & Sher, H. (2010). Effect of environmental factors on the yield of selected mushroom species growing in two different agro ecological zones of Pakistan. *Saudi Journal of Biological Sciences*, *17*(4), 321–326. https://doi.org/10.1016/j.sjbs.2010.06.004

Taylor J. (2021). *IoT Based Monitoring System for White Button Mushroom Farming*. EasyTyping.Com.

Tony. (2023). *MUSHROOM YIELD AND BIOLOGICAL EFFICIENCY*. Freshcap.

Vikaspedia. (2023). *Oyster mushroom production.* Vikaspedia.

Watson M. (2021). *What Are Oyster Mushrooms?* Thespruceeats.