



CREATIONS de UiTM
INTERNATIONAL MEGA INNOVATION CARNIVAL **2023**
Fostering Innovation to Global Communities

LET'S CRAFT A BETTER WORLD TOMORROW!

ePROCEEDING

20th MAY 2023

UNIVERSITI TEKNOLOGI MARA
CAWANGAN SELANGOR, KAMPUS DENGKIL
MALAYSIA

ORGANISED BY:



UNIVERSITI
TEKNOLOGI
MARA

Pusat
Asasi



Effect of Lights on Oyster Mushroom Indoor Cultivation

*Mimi Syazwani Suhaimi, Muhammad Nazeri

Pusat Asasi STEM, Universiti Malaysia Terengganu, Terengganu, Malaysia

*E-mail: mimi.suhaimi@umt.edu.my

ABSTRACT

Common edible oyster mushrooms are grown extensively over the world. However, the production yields of the oyster mushrooms are lower than the market demand. Additionally, traditional outdoor agriculture uses more area and is seasonal, which brings more unpredictable factors into the cycles of production. In order to save space, indoor production of the oyster mushroom was used in this work to study how the mushroom responded to various light intensities. Red, white, and no light at all were the intensities employed. According to this study, oyster mushrooms grow to their highest stem and cap sizes when exposed to white light, followed by red light and no light. In contrast to white light, oyster mushrooms are more numerous in red light intensities. Finally, it should be noted that the oyster mushroom's growth depends greatly on the light environment. The findings of this study may be useful to farmers in their efforts to increase harvest productivity as well as to other agricultural organisations.

Keywords: Oyster mushroom; light intensity; indoor; cultivation

INTRODUCTION

Mushrooms are the reproductive fruits of mycelium, a thick, root-like network of cells that resembles the fruits that trees produce. The oyster mushroom is easily recognised by its oyster-shaped cap and can be found in a variety of habitats, such as rivers, canals, dead hardwood trees, and woodlands. It is easily cultivable and edible. As a result, this type of mushroom is one of the most popular and in high demand worldwide.

The oyster mushroom is a good source of folic acid, protein, mineral salt, vitamin C, and vitamin B complex. *Pleurotus ostreatus* Lectin (POL), which is extracted from the oyster mushroom, has anti-cancer qualities that are advantageous in the biomedical and biotechnological industries, according to [3]. This is supported by [1,2,7] stated that the POL displays potent antitumoral effects in the fruiting bodies of the oyster mushroom.

The causes of oyster mushroom growth have been the subject of many research studies. The oyster mushroom's growth is influenced by a few different variables. Intensities of nutrients, temperatures, humidity, and lights are a few of these [5,6]. Fruiting bodies' ability to grow is influenced by both the length of the light cycle and the amount of light they get during the day.

The indoor cultivation is an alternative to the conventional outdoor cultivation. The traditional outdoor cultivation requires a larger area and is seasonal, adding greater unpredictability to the production cycles. With the use of IoT, indoor oyster mushroom growing has improved in both number and quality. It can also cover a larger area with less labour, which opens up more viable options for safeguarding the food supply [4].

INNOVATION DEVELOPMENT

In this study, white, red, and no light were used in an indoor cultivation environment while the other factors remained unchanged. The top sections of the three boxes were first taken off and set side by side in a laboratory space. As electricity is needed to turn on the light, the three boxes must be placed close to electrical sources (Figure 1). The first set of oyster mushroom blocks was then made. The set comprises of three oyster mushroom blocks that have been stacked in a pyramid setup and covered with a damp towel (Figure 2). There were a total of three oyster mushroom sets. Box A received a red LED light, while Box B received a white LED. Box C was used to simulate a dark environment. The red and white LED switch was turned on (Figure 3). On the box's base, each set of oyster mushroom blocks was placed. The three boxes were unopened for a week. For two weeks, there were weekly weight checks on the oyster mushrooms (Figure 4). During the weekly checking, the towel was moistened once more to maintain the humidity inside the boxes.



Figure 1: The three boxes were set up side by side close to their electrical sources



Figure 2: The three oyster mushroom blocks been stacked in a pyramid setup



growing process. In conclusion, the future actions that must be conducted are concerned with the consistency of checking mushroom growth every two days. The precision of the data recording will be enhanced by this step.

ACKNOWLEDGEMENT

This work was supported by Universiti Malaysia Terengganu. We would like to thank Dr. Aalia for the helpful discussions and idea. We also would like to extend our sincere appreciation to Mr. Md Rodilla, Mrs. Mahidawati, Mr. Khairul Ariffin, Mrs. Normaizianti, Mrs. Fatin Nabilah, and Mrs. Nur Harmiera for their guidance during the period of sample preparation and processing. Dr. Salmah's assistance in this study is something we owe her as well. Additionally, we are very appreciative of the encouragement and unwavering support of our family. Additionally, we acknowledge that Bashir Al Harith, Syafiq Amirul, Muflih Zawawi, Raja Ahmad Izzat, and Farid Imran contributed to our accomplishment in completing the study.

REFERENCES

- [1] Conrad, F., & Rüdiger, H. (1994). The lectin from *Pleurotus ostreatus*: purification, characterization and interaction with a phosphatase. *Phytochemistry*, 36(2), 277-283. [https://doi.org/10.1016/S0031-9422\(00\)97061-4](https://doi.org/10.1016/S0031-9422(00)97061-4).
- [2] Kawagishi, H., Suzuki, H., Watanabe, H., Nakamura, H., Sekiguchi, T., Murata, T., Usui, T., Sugiyama, K., Suganuma, H., Inakuma, T., Ito, K., Hashimoto, Y., Ohnishi-Kameyama, M., & Nagata, T. (2000). A lectin from an edible mushroom *Pleurotus ostreatus* as a food intake-suppressing substance. *Biochim Biophys Acta*, 1474(3), 299-308. [https://doi.org/10.1016/S0304-4165\(00\)00027-1](https://doi.org/10.1016/S0304-4165(00)00027-1).
- [3] Massimiliano, P., Laura D., Michele, B., Monica, G., Francesca, M., Michael, A., Fabio, F., Hugo, L M., & Stefano, C. (2020). Structure and properties of the oyster mushroom (*Pleurotus ostreatus*) lectin, *Glycobiology*, 30(8), 550-562, <https://doi.org/10.1093/glycob/cwaa006>.
- [4] Mohammed, M. F., Azmi, A., Zakaria, Z., Tajuddin, M. F. N., Isa, Z. M., & Azmi, S. A. (2017). IoT based monitoring and environment control system for indoor cultivation of oyster mushroom. *Green and Sustainable Computing*, 1019(7), <https://doi.org/10.1088/1742-6596/1019/1/012053>.
- [5] Sakamoto, Y., Sato, S., Ito, M., Nakahori, K., & Muraguchi, H. (2018). Blue light exposure and nutrient conditions influence the expression of genes involved in simultaneous hyphal knot formation in *Coprinopsis cinerea*. *Microbiol Res*, 217, 81-90, <https://doi.org/10.1016/j.micres.2018.09.003>.
- [6] Tariqul, I., Zarina, Z., Nasrul., H., & Ishak, M. (2017). Selection and Cultivation of Oyster Mushroom for the Indoor Controlled Environment in Malaysia and Similar Ecological Region. *MAYFEB Journal of Agricultural Science*. 1, 14-22.
- [7] Wang, H., Gao, J., & Ng, TB. (2000). A new lectin with highly potent antihepatoma and antisarcoma activities from the oyster mushroom *Pleurotus ostreatus*. *Biochem Biophys Res Commun*, 275(3), 810–816, <https://doi.org/10.1006/bbrc.2000.3373>.