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Models and Techniques of Automatic Humidity Temperature setting on Oyster Mushrooms using Digital Skylite

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Abstract : Oyster mushroom cultivation in areas that have high temperatures requires special maintenance techniques. The development of technology now makes it easy to carry out maintenance treatments for oyster mushrooms. Not even a few can regulate temperature and humidity automatically in the cultivation room. With an automatic temperature regulator can facilitate maintenance and minimize the failure of oyster mushroom production. However, the humidity temperature setting is not perfect enough if there are no models and adjusting techniques. The model that will be made by using Digital Skylite which is connected to the current source, Digital Skylite functions as an automatic timer. The purpose of this research is to get the right tool design model using Digital Skylite and to see the correct length of time in the Digital Skylite settings. The method used in data collection in this study is Direct Observation (Observation), Observation is carried out by examining and observing the object under study directly. The results of the study were to obtain a maximum temperature regulation design model.

Keywords : oyster mushroom, Digital Skylite, temperature, humidity.

1. Introduction

Oyster mushrooms usually grow in the forest, on wood. Along with the development of the times, now oyster mushrooms have been cultivated in ordinary houses called kumbung. Kumbung is a building where oyster mushroom cultivation is carried out. The initial stage in the cultivation of oyster mushrooms is preparing kumbung and making shelves where the baglog is stored. A kumbung building must have the ability to maintain temperature and humidity. The shelves are arranged vertically in order to maximize space in order to store more baglogs. Minimum space between the shelves is 40 cm. Shelf can be made 4 - 5 levels or can also be adjusted to a width of 40 cm. The shelves are made lengthwise to form a long corridor according to the length of the kumbung building. Minimum shelf space of 80 cm for easy maintenance. [1].

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Topographically, Sijunjung Regency has the potential for the development of oyster mushroom (Pleurotusostreatus). Oyster mushroom farmers in sijunjung district are still classified as a small part of this because the oyster mushroom farmers after cultivating mushrooms turned out to have many obstacles. At present it is not just how to cultivate mushrooms that are the main focus of business people, the most important thing to consider is how to care for mushrooms so that the resulting harvest has good quality, especially the quality of the mushroom kumbung [2].

Oyster mushroom cultivation in high altitude areas that have cold temperatures is common and very easy to regulate / care for it, while in lowland areas oyster mushroom cultivation requires temperature regulation and very extra humidity. For in hot areas, the temperature and humidity of the room for the growth of oyster mushrooms requires a temperature between 22 c - 28 c while the humidity is 80 - 90%. So that the growth of fungus in the kumbung can be optimal, the temperature and humidity of the kumbung must be maintained in accordance with its natural conditions. In the lowlands, temperature and humidity regulation of mushroom kumbung is still done manually, that is by simply spraying water droplets [3].

This method does not guarantee the suitability of the required humidity, other than that the temperature of the kumbung has not been regulated because it still relies on the temperature of the surrounding environment. Thus if the ambient temperature does not match the temperature required for oyster mushrooms, mushroom production will decrease. to maximize the growth of fungi temperature and humidity conditions need to be considered, so that the temperature and humidity conditions according to the needs of mushroom growth. One way to maintain the temperature and humidity of the kumbung is by making an appropriate model and arrangement that can maintain the ideal kumbung condition that the cultivation room has a temperature and humidity of +28 0C and 80% -90% RH. According to Anggi et al, 2016, research conducted using a temperature sensor, the results obtained from the average temperature difference of the Digital Humidity and Temperature (DHT) 11 sensor were 1,780 C and an average humidity difference of 4.8% using a comparator from a thermometer digital. [4].

According to, (AjiePutranto and Mad Yamin [5]. In research conducted on jute sacks used as a cooling medium for mushroom cultivation and wetting is done automatically using a timer every 15 minutes. After some wetting time, there is a real difference in the room temperature with wet burlap sacks and room temperature without wet burlap sacks. However, the relative humidity was not significantly different. The yield of mushrooms in 75 bag-logs under refrigerated room conditions with wet burlap sacks was 23.5 kg, while those that were not refrigerated yielded 16.7 kg.

So far there has been no study related to models and temperature regulation to increase the production of oyster mushrooms, only limited to cultivation. Thus research is needed on making models and techniques for automatic temperature regulation using Digital Skylite to correct temperature problems that have been troubled by oyster mushroom farmers so that later they can produce good oyster mushrooms[6]. The Purpose of This Research Is To Get The Right Tool Design Model Using Digital Skylite.

2. Materials and Methods

2.1. Research stages.

This research was divided into 2 stages, namely preliminary research and primary research. Preliminary research in the first year was carried out namely to make a series of water pipe network models and room temperature regulation. The main research in the second year is to do the application of tools and determine differences in yields between baglog mushrooms given additional treatment with those not.

2.2. Location and time of research.

This research was conducted in the Jamur Jaya farmer group in the STIPER area of SawahluntoSijunjung, the implementation of the study lasted approximately 6 months (May to October 2019).

2.3.Research Stages

1. Making oyster mushroom kumbung

Kumbung making is intended to ensure the size of the kumbung in accordance with the size of the nozzle to be designed.

2. Making baglog shelves

Baglog shelves are made using strong wood and are resistant to rain splashes, because the water that comes out of the nozzles is the same as rain water.

3. Creating a series of water pipe network models in room temperature regulation.

2.4. Data collection technique

The method used in data collection in this study is Direct Observation (Observation), Observation is carried out by examining and observing the object under study directly. (Belewu.2005.)

3.Results and Discussion

Making oyster mushroom kumbungBefore making kumbung, we first determine the size of the kumbung. The steps are as follows:

1) Determine the size of the kumbung

In general the ideal size of the kumbung is 4 m wide, 6 m long and 2.5 m high. in this study the size of the kumbung was made 8 m x 14 m with the height of the kumbung 3.5 m. Inside the kumbung, a plot is made to build a shelf to put mushroom baglogs. Distance between plots about 80 cm [7]

Picture. 1. Making Baglog Shelves

2) Kumbung parts

Mushroom kumbung walls are made of boards, the roof is made of zinc, the floor surface is coated with sand, while on the walls we make windows with the aim that the air circulation remains smooth.

The temperature regulation model that has been made can be seen in the image below:

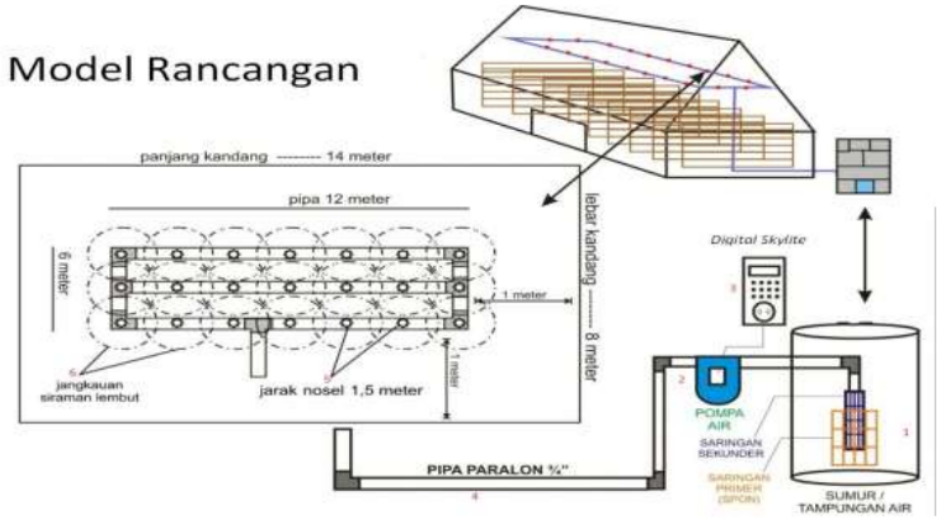

Image description 2:

Kumbung length: 14 m
Kumbung width: 8 m
Kumbung height: 4 m

From the picture above, the system works, which is first to prepare water, then connect the water pump machine with a current source and then prepare or adjust the Digital Skylite according to the time requirements, for example, we set it for 3 minutes. Automatically the water pump engine will shut itself down within 3 minutes. Water entering the pipes will be pushed to the nozzles that have been set in such a way with a nozzle distance of 1.5 m, because with a range of 1.5 m, the water can reach the farthest point from the edge of the kumbung wall

After testing, it turns out that the models and scales made in such a way can really be applied to oyster mushroom kumbung, and water spray that comes out of the nozzles according to a predetermined distance. The advantage of this model is that it can reduce watering work on oyster mushroom kumbung, and can increase the humidity of the kumbung room. The disadvantage of using this automatic temperature setting can cause the oyster mushrooms to rot quickly due to exposure to water splashing out of the nozzles.

4. Conclusion

Based on research that has been done, it can be concluded that the design model obtained is a simple network model with a distance between 1.5 m nozzles and a distance of baglog with nozzles as far as 50 cm.

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