

UTILIZATION OF DHT11 AND HC-06 SENSORS IN HUMIDITY AND TEMPERATURE CONTROL OF MUSHROOM CAGE

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Abstract. The need for food and healthy food is increasing now with the development of technology about food processing, especially foods with mushroom types. Oyster mushroom is one type of mushroom that is safe for consumption, because oyster mushroom is one kind of complementary food besides rice which has high nutritional value. Due to having a considerable economic value resulting in a lot of oyster mushroom cultivation which is a type of small business that starts from breeding, production, and processing of oyster mushrooms. Oyster mushrooms can grow in the area around the house, oyster mushroom cultivation takes into account several factors including air humidity, air temperature, and lighting regulation, this type of fungus should not be exposed to direct sunlight. In order to maximize yield, we need a kumbung. making the ideal kumbung namely mushroom kumbung which is always awake to the humidity of the air. While the media used is wood powder media mixed with katul with a composition of 15%, 2% lime, and 5% corn powder. Then the mixture is mixed with water with a composition of 60% and stirred, allowed to stand and check the degree of acidity. Then cooled put into polybags plastic and put in a barrel for cooking process (Steam) for 7 hours to sterilize the media. As for the humidity temperature is maintained between 23-28°C. The problems faced by oyster mushroom farmers in Jember City are the regulation of air temperature and humidity that are erratic, when the hot air is very dry humidity, and during the rainy season the humidity is very wet so that it interferes with the mushroom production process. So we need a mechanism that is able to deal with these problems by implementing a mushroom kumbung humidity control system automatically by using a DHT11 sensor connected to Bluetooth HC-06. The function of the DHT11 sensor has been adjusted to the temperature of oyster mushroom humidity. And the second solution is to help control the production and marketing processes by utilizing an integrated management information system

Keywords— Mushroom, DHT Sensor, Hc-06 Sensor, Temperature

1. Introduction

1.1 Background

The need for food and healthy food is now increasing along with the development of technology about food processing. For example is the oyster mushroom. Oyster mushrooms are needed by the community. Because Oyster mushrooms are a complementary food besides rice as a healthy and highly nutritious food. Lots of processed oyster mushrooms today. And also accompanied by the growth of small businesses ranging from seedling, production, and processing of oyster mushrooms.

The Chinese have known oyster mushrooms as food since the Chow Dynasty came to power around 3000 years ago. At that time mushrooms had been popular as special meals for State officials. Today mushrooms have become a necessity and a part of human life. Without mushrooms it is impossible to make bread, tempeh, tape, oncom, tauco, and drugs like Penicillin, and others.

Oyster mushrooms are much in demand by the public for consumption. Oyster mushrooms are easily cultivated. Oyster mushrooms can be planted around the house or yard by taking into account the air humidity, air temperature, and lighting settings, this plant should not be exposed to direct sunlight. Making ideal *kumbung* is mushroom place which is always maintained by the humidity. While the media used is wood powder media mixed with katul with a composition of 15%, 2% lime, and 5% corn powder. Then the mixture is mixed with water with a composition of 60% and stirred, allowed to stand and check the degree of acidity. Then cooled put into plastic polybags and put in a barrel for cooking process (Steam) for 7 hours to sterilize the media. As for the humidity temperature is maintained between 23-28°C and with humidity between 60-70%.

In terms of marketing aspects of this mushroom plant marketing is quite easy, because it covers a variety of market segments. The marketing used is to form a mushroom business group, making it easier for promotion to various directions. The marketing aspects that are carried out are as follows:

1. In terms of mushroom prices are not expensive only around Rp.10,000 - Rp.12,000 per kilo

Placement of mushroom cultivation is very strategic because it is close to the center of Jember city, where Jember city there are many culinary places that use mushrooms as an ingredient

3. Promotion efforts with social media and the creation of blogs and internet media to expand business networks.

4. Following the exhibition held by the relevant Office

5. Good and hygienic packaging

1.2 Problems

In the mushroom business in UD.Jamur Tiramku there are 2 problems:

1. Inadequate mushroom *kumbung* has collapsed because the weather in the last rainy season needs to be a concern of its own. So that for the maturation process with moisture the fungus is temporarily moved into the kitchen room with a tin roof so that when the sun is hot, the conditions in the kitchen are temporary hot, and during rainy weather the conditions of the kitchen used as temporary *kumbung* are too wet

2. The problem that is often faced by UD mushroom partners. The oyster mushroom is an uncertain weather change, with the height of the Jember area not so high that the temperature in Jember and surrounding areas tends to be hot so the baglog productivity is less stable.

3. The marketing and production processes are less than optimal and unorganized so that it cannot be known from the production of mushrooms, the number of which is 1000 baglogs can become 300 baglogs because they are damaged, so it is unknown how much loss is experienced by UD.Jamur Tiramku. The buyer labeled by own labeled of Oyster mushroom products. oyster mushrooms are bought at a price of Rp.5000-Rp.7000 per kilo because there are many molds that are damaged due to lack of moisture.

2. Methods

2.1 IT Training on Production process, Marketing Strategy and Packaging Process

The method of implementation is:

1. Make sticker labels and printing paper labels on Mushroom packaging

2. Pack the Mushroom in 0.5 Kg plastic container.

3. laminate the Mushroom packaging with a mushroom packer

4. For the production process is made IT-based information management systems so that they can be controlled starting from the purchase of seeds, the purchase price of seeds, the price of the production process, and mushroom products that are ready to sell with their own packaging and own labels.

Mushroom Product Labels completed with tourist attractions in the district of Jember and describe with English as an international language. It can make UD.Jamur tiramku sold to place that have many foreign tourists.

5. Created social media from internet networks and blogs which is managed by UD.Jamur Tiramku.

2.2. Design and Manufacture of Automatic Temperature Control and Humidity Control Oyster Mushroom with DHT11 Sensor connected with Bluetooth HC-06 Module

This activity was carried out in order to make an automatic humidity control device with a DHT11 Sensor connected to the Bluetooth HC-06 Module

To monitor the humidity of mushroom place (kumbung) in 24-hour that can increase scale of production. The phase carried out in this activity are:

a. Field observations

To seek input on the problems that exist in the partner's business, a meeting and discussion with the two owners of the UD Jamur Tiramku

1. Observe the process of buying wood husk
2. Observe the process of importing wood husk into baglog
3. Observe the process of entering mushroom seeds into baglog
4. Observe the condition of fungal sterilization in the mushroom wall
5. Observe the condition of the humidity temperature in the mushroom room

b. Design of Automatic Control Humidity Oyster Mushroom place (Kumbung) in UD. Oyster Mushroom with DHT11 Sensor connected with Bluetooth HC-06 Module

c. Fabrication and Assembly

d. Equipment Operation and Equipment Maintenance Training

This training aims to make UD jamur Tiramku able to run this tool and be able to carry out maintenance so that the tool becomes durable.

f. Making an IT-based Information Processing and Production Process management system.

g. Making Packaging Oyster mushroom products that are clean, neat and hygienic with label UD.Jamur Tiramku and promote also tourism of Jember Regency by using English as an international language

h. Create website and promotion on social media of UD.Jamur Tiramku mushroom

i. Monitoring and Evaluation

After completing training, it is carried out monitoring and evaluation of the function of the tool in the production process. So that this tool can function well and durable. One month later there was also a visit and monitoring to the PKM partners to see the success of the tool and see the obstacles that exist in the field.

j. The target of the output is increase in knowledge and skills

Mushroom Business UD. Jamur Tiramku, Sumber pinang village, Pakusari district, Jember .

2.3 flowchart

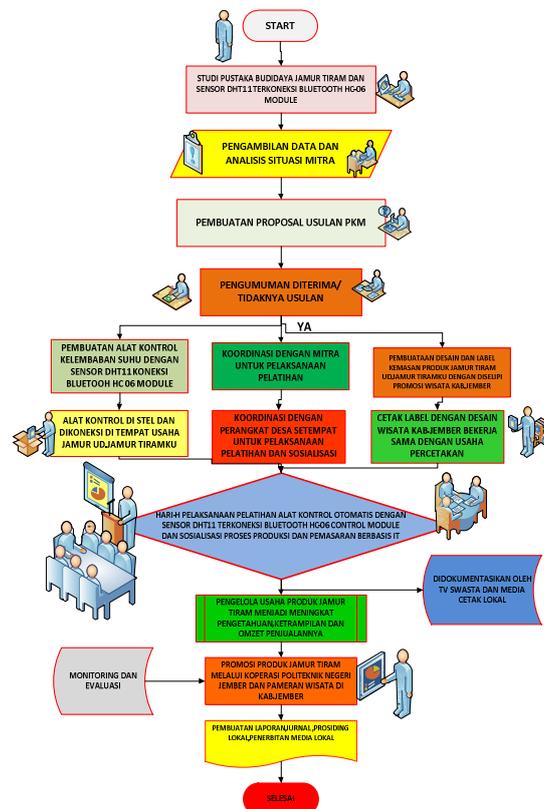


FIGURE 1. Flowchart

3. Result and the Output

3.1. Result

The implementation of the Community Service Program, DRPM Funding at the first phase namely survey and partner collaboration.

Phase I: Survey and Partnership collaboration was conducted on 19-23 July -2019

Phase II: making mushroom place (kumbung), in this phase is the discussion for the installation process of mushroom place (kumbung) pile foundation. It can be seen in the figure below.



Figure 3. the installation process of pile foundation

Phase III: Installation of mushroom wall and installation of water pump is on 21 - 23 - July - 2019. Installation of water pump begins with the process of measuring the distance from the water source that is the well to the mushroom wall, then installation of water pipes and water pump. Installation of water pump and pipes as shown in the figure below:



Figure 3. water pump installation

Phase IV: the installation of DHT 11 sensor. It measure the humidity and temperature of oyster mushroom place (kumbung)



Figure 4. the installation of DHT-11 sensor



Figure 5. DHT-11 sensor



Figure 6.the humidity and temperature showing at DHT-11 sensor

3.2 outcomes

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4. Conclusion

1. Oyster Mushroom Production Process for small-scale production in the Village technology is still needed to improve the knowledge and skills of oyster mushroom partners so that the production of mushroom products are of good quality.
2. Oyster Mushroom production process requires controlled temperature and humidity conditions with temperatures between 27-29°C and humidity between 60% - 70%, so automatic temperature and humidity control is required by using the DHT-11 temperature sensor
3. the knowledge and skills of mushroom partners are increasing through community service program.

5. Suggestions

1. the knowledge and skills of mushroom partners are increasing through community service program

2. There is a way to re-design or re-design the mushroom place (kumbung) in order to create mushrooms with good quality
3. Observations for the cooking process of mushrooms with an optimal temperature so that the temperature inside the mushroom place (kumbung) can be controlled properly
4. Further activities for the cooking process of mushrooms such as mini steam boiler for the cooking process and cooking stoves using solar power
5. It is necessary to observe for the cooking process of mushrooms with an optimal temperature so that the temperature inside the mushroom place (kumbung) can be controlled properly

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