



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT OF SMART MIST SPRAY ON STAND
ALONE MUSHROOM HOUSE**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Technology Electronics Engineering (Electronic Industry) with Honours.

By

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Technology Electronics Engineering (Electronic Industry) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Semburan kabus untuk rumah cendawan yang berdiri sendiri tanpa mana-mana sumber elektrik yang sedia ada ini diperkenal adalah berasaskan sumber air semulajadi samada hujan mahupun embun. Ia diperkenalkan adalah untuk mengawal kelembapan didalam rumah cendawan supaya proses pertumbuhan cendawan berjalan dengan lancar. Melalui sistem semburan kabus yang diciptakan ini, petani-petani yang mengusahakan pertanian cendawan ini tidak perlu risau sekiranya kehabisan atau terputus sumber air yang sedia ada untuk memastikan kelembapan didalam tempat penyimpanan bongkah-bongkah cendawan terjaga. Melalui pengumpulan sumber semulajadi iaitu embun dan hujan dapat memastikan penyimpanan sumber air sentiasa ada dimana untuk memastikan kelembapan terjaga, semburan kabus akan berhubung dengan ARDUINO UNO untuk memberi arahan kepada semburan kabus berfungsi. Kaedah ini dapat memudahkan kerja para petani dalam mengawal kelembapan didalam tempat penyimpanan cendawan.

ABSTRACT

Mist Spray for stands alone mushroom house without any electric source being introduced it is based on natural sources of water whether rain or dew. It is introduced is to control inside humidity mushroom house so that mushroom growth process run smoothly. Through mist spray system, farmers that work for this mushroom agriculture do not need to be worried if run short or no sources water that is exist to make sure the humidity and temperature for mushroom house. Through natural water sources which is rain and dew, the water storage will be exist to make sure the humidity look after, mist spray will contact with ARDUINO UNO to give the signal so mist spray will function. This method will help farmers to control the humidity in mushroom house.

DEDICATION

This dedication especially to my parents, Zainuri Bin Yaakob and my mother, Ainon Binti Ismail, not forget to my husband Abu Ayub Bin Razak also my son Muhammad Al Fateh Bin Abu Ayub who always give a supported and taught me that to believe in hard work and put trust in Allah S.W.T.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter aims to create the framework and introduces the project's brief idea. It focused on the project overview, detailing the goals, briefly explaining the problem, scope, and providing the project outcome. The structure of the entire project can therefore be visualized accurately.

1.2 Background of Study

Mushroom contain high protein, carbohydrate, multivitamins and minerals which are really good for the healthy and have higher of folic acid. Vitamin and mineral that contain in mushroom can be use for nutraceutical, pharmaceutical and cosmetic product. Another benefit of mushroom is low cholesterol and help to bleeding (*Chang and Miles 2004*). Industry of Mushroom in Malaysia still new and small, but growth increase when the mushroom demand increasing with some knowledge to consumer about the benefit of mushroom especially about the health besides this information have been spread to others by government agencies. Regarding to Che Hasmah (2008), there have 648 mushroom farmers on 2008. However, the quantity who decrease to 334 on 2010 and this decreasing give some effect which is the demand on the market less to 24,000 kg/day compare to 50,000 kg/day before this. Government identify the mushroom industry has the potential to be developed because demand has been increase in line with increase in population. Consumption per capita mushroom expected increase from 1.0 kg in 2008 to 2.4kg in 2020(and 2010).

The higher demand of mushroom had increase in Malaysia are there intends to control the manufacture. Meanwhile, the mushroom needs higher humidity which is reach 60% to 80% while the temperature must reach below than 30 degree Celsius. To overcome with this situation where to stabilize the humidity and temperature as required to make sure the growth of mushroom can be good. The aim of this project is to develop mist spray for stands alone mushroom house.

1.3 Problem Statement

To produce good mushroom is required moisture. The moisture of mushroom can easily lost because they have no skin. Because of this situation, mushroom need to high humidity around them to avoid water loss. Besides that, the ideal mushroom cultivation humidity is upper than 60% to 80%. However, in this situation, the humidity and temperature cannot reach as expected value always especially at evening because of the weather which is sometimes can't reach high humidity and good temperature suitable for mushroom growth.

1.4 Objective

The objectives for this project are:

- a) To develop smart system of mist spray for stands alone mushroom house.
- b) To identify the best parameter to achieve humidity 60% - 80%.

1.5 Project Scope

The scope of this project is to create a system for stands alone mushroom house using Arduino UNO. This project used Arduino UNO as it microcontroller. It is because Arduino UNO is cheap compare to any other microcontroller. In this project, arduino UNO will be power ON using solar panel because of no incoming power and water as it stand alone mushroom house. The turn on the solar panel, there have 3 elements to turn on the

system which is solar panel, control panel and battery. The battery will be stored the energy before it will be used.

The mist spray will turn ON when the humidity not reaches 60% then it will turn OFF automatically when the humidity achieve to 80%. This system will be OFF to save energy since it use solar energy. The humidity and temperature measurement will be display on LCD 16x2.

However, this condition can be tune regarding to humidity that want to be reach because of different humidity at any place. This changing can be setup by using mobile application.

1.6 Thesis Outline

In chapter 1, it will be explain briefly about the possibility of the project. Tasks background will be discussed in this part. This part will concentrate on the outline of the undertaking, specifying the objective, the issue articulation, and the project scope.

In chapter 2, this section was about the idea, hypothesis, and some characteristics of equipments and component that utilized as a part of this task. This part contains a meaning of term used as a part of this undertaking and furthermore discusses about the idea from research paper and how it identified with the theoretical method.

In chapter 3, it will be explain about methodology which is the step that needs to be following to complete the project. Besides that, on this chapter, details of the studies and it is also consists the details about components to develop the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review is an essential part before part before beginning the project because it provides all requirement data related to the project. Based on that, the correct direction in developing the project can be performed proficiently. In this chapter, topic that will be explained are system and the idea that can be implement and previous related work.

2.2 Past Related Research

In order to make this project successful, some studies and inquiring about has been taken out. Data and studies for this project is gathered from numerous sources such as books, articles, journal, and also web. All this data was utilized in this project as a guide to ensure this project should be possible in the time given. All the studies and information gathered depended on significant and topic that related to this project.

In this part, a few article and publication journal from website are explored based on the scope. A few keywords were used to find the related information which is dew collector, rain collector and mist spray for mushroom. This research focuses on develop mist spray using natural water for stands alone mushroom house which is an important coverage of problem solving. To complete this project, eight journals about mist spray for stands alone mushroom house are choose focusing in development of mist spray for stands alone mushroom house.

2.2.1 Biomimetic prototype to the physio-anatomy of the cactus *Pachycereus Pecten-Aboriginum*, for application to catchment system atmospheric dew water.

According to (Hernández, 2016), environmental condition and the area to be covered is bear on the volume of water collected. The material that has used on the glass as the main material. This project proposes for idea to create an organic gardens and green roofs. These tests have been done in Mexico City on March and May. These systems focused on home use since the population has been increase. Drip irrigation system was used to sustainable development program for green roofs and organic garden. A cactus has been inspired to develop water catchment prototype dew. The design of this dew catchment characteristic with 1 ribs with 56 cm high, 80 areolas or 8 areolas by rib and 11 radial spines 2 cm approx. To help water runoff, the prototype is spongy to deep a lattice of copper with 3 mm thick of clear glass was used using cast glass technique where the thorns thickness is 1 mm.



Figure 2.1: The project with idea of cactus.

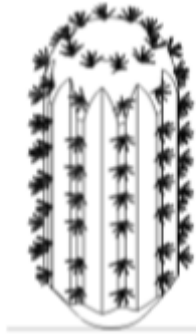


Figure 2. 2: Prototype of project design

Data have been completed for two days (12-13 March) which there is no water collected since the temperature is too high while the humidity not reaches over than 75%. However, the humidity is high at 4:00 to 7:00 a.m. This has been recorded at the graph below where T_a is ambient temperature, T_d is dew point, T_m is temperature for materials and T_e is temperature thorns. In the other months on (31 May-1June), the amount of dew have been collected 10ml. This is because of the presence of rain and the sky is cloudy at the day. The temperature and humidity reading have been showed in the graph.

2.2.2 Fog and Dew collection Projects in Croatia

(Beysens *et al.*, 2007) stated that, especially during the drier summer season, dew is a significant source of water. There are three sites, Zadar, Komiza and Bisevo. In Zadar and Komiza, and dew yield was measured at a horizontal angle at the same condensers of 1 m x 1 m (Fig. 2.3). The 30 ° angle for dew harvesting is the "best" angle of inclination (Beysens *et al.* 2003). Dew quantities were measured daily in the morning, corresponding to the water collected in a bottle by gravity flow and scraped as a figure below from the surface.



Figure 2. 3: Design for dew collector with angle 30 degree

In Bisevo, Muselli et al. 2002 describe the technique that can be used as a small house covered on the roof with thermal insulated polycarbonate sheets. This method was used instead of droplets to condense a liquid film. Dew water that was not scraped using this method was turned upside down due to the material surface to expose the hydrophilic surface to the sky.



Figure 2. 4: Dew collector with thermal isolated polycarbonate plate from Muselli et al.