

**UNIVERSITI TEKNOLOGI MARA**

**MONITORING DEVICE FOR  
MUSHROOMS' IDEAL GROWTH BY  
USING ESP32 MICROCONTROLLER  
FOR FARMERS (MODMUSH)**

**AMEER FARHAN BIN AHMAD FUAD**

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## ABSTRACT

This study aims to design a Monitoring Device for Mushrooms' Ideal Growth by using ESP32 Microcontroller for Farmers, called *MoDMush*. In this project, several sensors will be utilized with the purpose of monitoring the current surrounding condition inside of the mushroom house. These measured parameters will be sent to the microcontroller, and according to the thresholds that were set for each of the sensors through the IoT interface, the ESP32 will respond to the data. Other than that, an IoT platform called Blynk is also implemented in this device. Via a stable internet connection, this platform allows users to monitor the real – time surrounding condition of the cultivation area remotely by merely installing an application in their smartphones. A DHT22 Air Temperature and Humidity Sensor, MQ – 135 Air Quality Sensor and Water will be the input, meanwhile the LCD, LED and Water Spray will be the output in this project. By integrating both hardware and software implementations, this project strives to create an advanced and efficient method of farming. This will in return help to reduce the significant amount of workload required in mushroom cultivation sector as compared to the traditional method of farming. Therefore, it can be said that this project facilitates the workload of farmers, and in conjunction with that, helps to reduce the labor cost required for the mushroom cultivation process.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 PROJECT OVERVIEW

The continuous growth and demands for mushroom supplies in Malaysia had become an eye – catcher for fellow Malaysians in the past few years. The attention gained through this cultivation sector is further amplified after an article, sharing the success of Muhamad Lokman Hakim, alongside his two siblings in achieving the sales of RM10,000 worth per month in Mushroom Farming, was published on the 16<sup>th</sup> of September 2022 by *The Star* [9]. The demand for these herbal plants had been at its peak due to the benefits that they provide to humans. Due to their exquisite taste and delightful aroma, mushrooms have become the main attraction for these agricultures to be used in the food industry. Moreover, mushrooms also consist of 20% - 40% essential proteins that are required for humans' healthy diet (Mshigeni and Chang, 2000) [1]. Due to their rich source of bioactive compounds, mushrooms are often used for medicinal purposes. In fact, they have been one of the massive contributors to the world of vast medicine since ancient times [3]. Furthermore, scientific studies done by Chang and Buswell (1999) showed that these herbal plants indeed exhibit several positive effects on humans, especially in pharmacological and physiological effects. These include immunomodulatory, antidiabetic, anti – cancer and anti – aging [11]. Due to these causes, a lot of farmers tend to jump on the bandwagon to participate in this agricultural sector of the economy.

However, mushroom cultivation is influenced by numerous factors. Besides the basic needs such as water, source of light and air circulation, environmental aspects such as air temperature, air relative humidity (RH) and Carbon Dioxide (CO<sub>2</sub>) concentration also act as the pivotal part in ensuring the optimal growth for the plant is achieved. According to Hanani Abd Wahab et al., about 80 % - 90 % of Relative Humidity (RH) is required for the ideal growth of the mushrooms [2].