

**PENGEMBANGAN SISTEM OTOMATISASI PENYIRAMAN
PENGENDALIAN SUHU DAN KELEMBAPAN KUMBUNG
JAMUR BERBASIS *MIKROKONTROLER***

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ABSTRAK

Budidaya jamur merang membutuhkan pengendalian suhu dan kelembapan yang terjaga secara konsisten agar proses pertumbuhan dapat berlangsung secara optimal. Pengelolaan lingkungan kumbung yang masih dilakukan secara manual sering menimbulkan ketidakstabilan kondisi suhu dan kelembapan, sehingga berdampak pada kualitas serta kuantitas hasil panen. Berdasarkan permasalahan tersebut, penelitian ini bertujuan untuk merancang dan mengembangkan sistem otomatisasi penyiraman serta pemantauan suhu dan kelembapan kumbung jamur berbasis mikrokontroler. Sistem yang dikembangkan memanfaatkan NodeMCU ESP32 sebagai unit pengendali utama, dilengkapi dengan sensor suhu dan kelembapan untuk membaca kondisi lingkungan secara real-time, serta aktuator berupa pompa air, kipas blower, dan lampu pijar yang berfungsi mengatur kondisi kumbung secara otomatis sesuai parameter yang telah ditentukan. Tahapan penelitian meliputi proses perancangan sistem, pembuatan prototipe, pengujian kinerja, hingga evaluasi hasil pengujian. Melalui sistem ini diharapkan suhu dapat dipertahankan pada rentang 30–32°C dan kelembapan berada pada kisaran 80–95% RH sesuai kebutuhan pertumbuhan jamur merang. Implementasi sistem otomatisasi ini diharapkan mampu meningkatkan efisiensi pengelolaan kumbung, memperbaiki akurasi pengendalian lingkungan, serta mengurangi ketergantungan terhadap metode manual.

Kata kunci: Sistem Otomatisasi, Jamur Merang, Mikrokontroler, Suhu, Kelembapan.

DEVELOPMENT OF AN AUTOMATED IRRIGATION SYSTEM FOR TEMPERATURE AND HUMIDITY CONTROL IN A MUSHROOM HOUSE BASED ON A MICROCONTROLLER

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ABSTRACT

Straw mushroom cultivation requires consistent control of temperature and humidity to ensure optimal growth. Environmental management in mushroom houses (kumbung) that is still carried out manually often leads to unstable temperature and humidity conditions, which in turn affects both the quality and quantity of the harvest. Based on these problems, this study aims to design and develop an automated system for irrigation as well as monitoring temperature and humidity in the mushroom house using a microcontroller. The system utilizes the NodeMCU ESP32 as the main control unit, equipped with temperature and humidity sensors to read environmental conditions in real time, and actuators such as a water pump, blower fan, and incandescent lamp to automatically regulate the environment according to predetermined parameters. The research stages include system design, prototype development, performance testing, and evaluation of the test results. Through this system, it is expected that the temperature can be maintained within the range of 30–32°C and humidity at 80–95% RH, in accordance with the growth requirements of straw mushrooms. The implementation of this automation system is expected to improve the efficiency of mushroom house management, enhance the accuracy of environmental control, and reduce dependence on manual methods.

Keywords: Automation System, Straw Mushroom, Microcontroller, Temperature, Humidity