

***Design of IoT (Internet of Things) System on MAGDRY BSF (Smart Dryer
Maggot Black Soldier Fly) Device for Temperature Control and Motor Rotation
Speed***

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ABSTRACT

The Black Soldier Fly (BSF) maggot drying process still faces various obstacles such as weather dependence, long time, and low temperature stability, thus potentially reducing the nutritional quality of maggots as alternative animal feed. This study aims to design and implement an Internet of Things (IoT) system on the BSF Magdry (Black Soldier Fly Maggot Smart Dryer) tool to control the drying chamber temperature and motor rotation speed automatically. The system was developed using an ESP32 microcontroller as the main control unit, a calibrated DS18B20 temperature sensor, a heating element with a hysteresis control method, a DC motor using the Pulse Width Modulation (PWM) technique, and an I2C LCD for local display. Remote monitoring and control are carried out through the Blynk application, equipped with an offline mode feature that utilizes ESP32 flash memory. Test results show that the DS18B20 sensor achieves high accuracy with an average difference of $\pm 0.15^{\circ}\text{C}$ and a maximum difference of $\pm 0.2^{\circ}\text{C}$ after calibration. The system maintains a stable temperature at a setpoint of 60°C with minimal fluctuation. The PWM value is linearly related to drum rotation speed, with a speed range of 2.28 RPM to 29.80 RPM. The IoT system performs well for real-time monitoring and remote control in both online and offline modes.

Keywords: *IoT, RPM Control, Temperature Control, MAGDRY BSF, Maggot Dryer.*