

***Temperature and Humidity Monitoring and Control System for the Ecosolar In-Store
Shallot Dryer in Brumbungan Lor Village, Probolinggo***

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ABSTRACT

EcoSolar Instore Onion Dryer is an onion drying device based on an Arduino system. This study aims to design and evaluate a temperature and humidity monitoring and control system for a solar panel-based shallot drying device in Brumbungan Lor Village, Probolinggo Regency. The developed system is intended to improve the efficiency of the drying process through automatic temperature and humidity regulation. The system utilizes a DHT22 sensor for temperature and humidity measurement, an Arduino microcontroller as the main controller, a 20×4 I2C LCD for real-time data display, an RTC DS1307 module for time recording, an SD Card as data storage media, and relays to control the heater and exhaust fan. This research employed a descriptive approach, involving system component testing and analysis of monitoring results during the drying process. The results showed that the DHT22 sensor was able to accurately record temperature and humidity data. The 20×4 LCD displayed temperature, humidity, and time data in real time, while the RTC DS1307 module provided accurate timekeeping. The SD Card consistently stored measurement data in CSV format. Relay testing showed that the heater was activated when the temperature was $\leq 45^{\circ}\text{C}$ and deactivated when the temperature reached $\geq 48^{\circ}\text{C}$ according to the programmed control logic. The exhaust fan also operated effectively, turning ON when humidity was $\geq 45\% \text{ RH}$ and OFF when humidity was $\leq 40\% \text{ RH}$, helping maintain stable conditions inside the drying chamber.

Keywords: DHT22, Humidity, Monitoring System, Red Onion, Temperature.