

RANCANG BANGUN SISTEM PENGONTROL SUHU DAN KELEMBAPAN UDARA, SERTA PEMANTAUAN INTENSITAS CAHAYA PADA *GREENHOUSE* BERBASIS MIKROKONTROLER ARDUINO UNO

*Design of Air Temperature and Humidity Control System, and Light Intensity Monitoring on The
Greenhouse Based on Arduino Uno Microcontroller*

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ABSTRAK

Greenhouse digunakan untuk menjaga kestabilan suhu dan kelembapan udara agar sesuai dengan kebutuhan tanaman, sehingga tanaman dapat tumbuh dan berkembang dengan baik. Pada penelitian ini dirancang sebuah alat pengontrol suhu dan kelembapan udara, serta pemantauan intensitas cahaya di dalam *greenhouse* menggunakan sensor SHT10, Sensor BH1750, pompa air DC, *exhaust fan*, *relay*, *module data logger*, RTC, kabel pelangi, dan Arduino Uno. Berdasarkan hasil penelitian suhu tertinggi terjadi pada siang hari dan suhu terendah terjadi pada malam hari. Pengujian alat sebelum dilakukan pengontrolan suhu tertinggi mencapai 40,7°C, sedangkan kelembapan terendah mencapai 57,2%. Pengujian setelah dilakukan pengontrolan suhu tertinggi mencapai 37,7°C, sedangkan kelembapan terendah mencapai 57,9%. Intensitas cahaya tertinggi mencapai 7805 Lux. Kinerja sistem kontrol berdasarkan ketepatan aktuator mengendalikan suhu dan kelembapan udara sesuai dengan *set point* atau berada pada zona terkontrol. Aktuator kipas dan pompa 1 stabil mencapai akurasi 94,29%, dengan durasi 120 menit. Aktuator pompa 2 stabil mencapai akurasi 87,7%, dengan durasi 240 menit. Setiap komponen yang bekerja pada alat sistem pengontrol suhu dan kelembapan udara, serta pemantauan intensitas cahaya ini bekerja dengan baik dan sesuai fungsinya. Jika suhu di dalam *greenhouse* mencapai $\geq 35^{\circ}\text{C}$ kipas dan pompa 1 menyala dan mati apabila suhu sudah mencapai $\leq 32^{\circ}\text{C}$, jika kelembapan mencapai angka $\leq 65\%$ pompa 2 menyala dan akan mati jika kelembapan mencapai $\geq 75\%$.

Kata kunci: cahaya, *greenhouse*, kelembapan, kontrol, suhu

ABSTRACT

Greenhouses are used to maintain a stable temperature and humidity to match plants needs, so plants can grow and develop properly. In this study, a temperature and humidity controller was designed, as well as monitoring of light intensity in the greenhouse using the SHT10 sensor, BH1750, DC water pump, exhaust fan, relay, data logger module, RTC, rainbow cable, and Arduino Uno. Based on the research results, the highest temperature occurs during the day, and the lowest temperature occurs at night. Testing the tool before controlling the highest temperature reached 40.7 °C, while the lowest humidity reached 57.2%. After controlling for the

highest temperature, the test reached 37.7°C, while the lowest humidity reached 57.9%. The highest light intensity reaches 7805 Lux. The control system's performance is based on the accuracy of the actuator controlling the temperature and humidity of the air according to the set point or being in the controlled zone. The fan and pump actuator 1 is stable and achieves an accuracy of 94.29%, 120 minutes. Stable pump actuator 2 achieves an accuracy of 87.7%, with a duration of 240 minutes. Every component that works on the temperature and humidity control system, as well as monitoring the light intensity, is working correctly and according to its function. Suppose the temperature in the greenhouse reaches 35°C, and the fan and pump 1 turn on and off. When the temperature reaches 32°C, if the humidity reaches 65%, pump 2 turns on and will turn off when the humidity reaches $\geq 75\%$.

Keywords: *light, greenhouse, temperature, humidity*