

ABSTRACT

Chili plant is one of the plants needed in Indonesia. Many people are interested in cultivating special red chilies, both for hobbies and for their own consumption. However, currently the availability of land for farming, especially in urban areas, is no longer available. Especially for those who live in apartments. So the solution is an IoT-based hydroponic farming method.

In this final project, an IoT-based hydroponic system is designed and realized for monitoring the temperature around the planting medium with a length of 140cm, a height of 9cm, and 5 holes to be filled by plants. The sensors used in this final project include the DHT22 sensor to measure the ambient temperature, the HC-SR04 sensor to measure the water level, and the pH sensor to measure pH levels. And in this tool there is monitoring of the environmental temperature around the planting media using the DHT22 sensor, monitoring the water level in the growing media using the HC-SR04 sensor, and monitoring the pH levels in the growing media using a pH sensor. In addition to monitoring this tool, there is automatic control of pH levels with a pH sensor and water level control with the HC-SR04 sensor. All sensors will be connected to Arduino Uno as the main microcontroller. Which will later be seen in the Blynk application on smartphones.

The test results in this design are the maximum water level on the hydroponic growing media, which is 9cm, it's just that there is a limitation on the water level in the planting medium making the maximum water level at a height of 5cm, and the ultrasonic sensor is set to be the water level limit on the planting medium 6cm. So that the water in the planting medium will flow continuously as a circulation. The first test on the ultrasonic sensor filled the planting medium in an empty state of water up to a height of 5 cm and it could be filled in 2 minutes 11 seconds. In the second test the water level remained stable at a height of 5cm with the accuracy of the test with a comparison measuring instrument, namely the ruler, getting the HC-SR04 sensor accuracy of 100%. The second test is the pH level using a pH sensor to get an average pH level of 6.1675, the lowest pH at 6.050, and the highest pH at 6.440. Measurements on the pH sensor compared to the pH meter get a pH sensor accuracy of 97.78%. Subsequent tests on the temperature sensor with an average temperature of 24.56 °C, the lowest temperature is 19.1 °C, and the highest temperature is 29.2 °C. The comparison tool used for the DHT22 sensor is the thermometer to get the DHT22 sensor accuracy of 98.74%.

And all the results of the parameters installed in this design are sent to the Blynk application as a place for monitoring and the data sent according to the Arduino Uno monitor. Chili plants are also approximately 6 weeks old with the condition of the chili plants not flowering and fruiting, when they are in the hydroponic growing media, the chili plants begin to bear fruit within 2 weeks and within 4 weeks the chili plants have started to ripen.

Keywords: *Arduino Uno, Monitoring, Hydroponics, Chili*