

ABSTRACT

The Internet of Things (IoT) represents a tremendous opportunity for introducing automation across many areas, one of which is soilless agriculture such as aeroponics. Aeroponics itself is a one of many soilless farming methods, which considered to be more efficient in terms of nutrient and water usage. However, its application in household environments, which requires intensive monitoring has not yet been optimal. Therefore, this study aims to design and test a device that capable of doing the monitoring automatically for aeroponic system. The device in question comprises sensors to measure air temperature and humidity (*DHT-22*), the height of the nutrient solution (*HC-SR04*), the pH of the solution (*DFRobot pH Meter 2.0*), and the solution temperature (*DS18B20*).

On this study, the tests will be done by comparing sensor readings displayed on the *Arduino IDE* serial monitor with reference instruments such as an alcohol thermometer, a commercial pH meter, and a ruler in order to calculate each sensor's error rate. The results showed that the *HC-SR04* sensor had an average error rate of 4,23%. The *DHT-22* sensor demonstrated a good accuracy with an average error rate of 1,42%, though its performance dropped sharply under extreme temperatures, yielding an average error rate of 58,39%. The pH sensor exhibited a relatively high error rate of 13,90% when used in a larger container, due to the probe's limitations under those conditions. The usage of *DS18B20* sensor is approved that it's not necessary for a system of this scale, as the *DFRobot* library's internal calculations were already sufficient.

Implementing remote monitoring and control through Blynk application can help user to observe the plants online, but the limited features for free account can be its own challenges. I hope this research will serve as a foundation for developing more accurate, efficient, and accessible household-scale automated aeroponic systems.

Keywords : *Aeroponic, Internet of Things, Sensors, Blynk, C++*