

ABSTRACT

*Indonesia, as an agrarian country, faces challenges in the agricultural sector with low growth, which impacts food availability and nutrition. Hydroponic verticulture offers a solution by utilizing limited land in densely populated areas, such as for the cultivation of lettuce (*Lactuca sativa* L.), which has high economic value and good nutritional content. In hydroponic systems, pH and Total Dissolved Solids (TDS) greatly affect the availability of nutrients for plants. Inappropriate pH can inhibit the absorption of nutrients, while TDS that is too high or low can indicate an imbalance of nutrients, therefore a system that can accurately control the state of pH and TDS is needed. The application of Internet of Things (IoT) technology in modern agriculture can increase productivity through automated monitoring and control. This research aims to integrate the Blynk application to monitor and provide alerts via smartphone, evaluate the accuracy of pH, TDS, and ultrasonic sensors, and assess the quality of data transmission from ESP32 to the Blynk platform. The method used is forward chaining with forward reasoning and measurement of sensor accuracy and data transmission delay as well as QoS analysis. The results show that the system enables responsive monitoring and control via Blynk, with a pH sensor accuracy of 97.17%, TDS sensor 99.36%, and ultrasonic sensor 99.68%.*

Keywords: *Hydroponics Verticulture, Internet of Things, Lactuta Sativa L.*