

ABSTRACT

Improving efficiency and effectiveness in melon cultivation within greenhouses requires technological innovations to support the automation of irrigation and nutrient delivery systems. This study developed an Internet of Things (IoT) system for automating the preparation of nutrient solutions, featuring scheduled water filling, electrical conductivity (EC) measurement, and pH measurement. The system is designed to ensure that the nutrient solution maintains the appropriate acidity (pH) and concentration levels to meet the plants' requirements, thereby supporting optimal growth and enhancing crop yields. The developed system consists of microcontroller-based hardware, pH sensors, electrical conductivity sensors, actuators for water filling and solution mixing, and an IoT platform that enables real-time monitoring and control through web and mobile applications. Water filling is performed on a scheduled basis, adjustable by the user, while pH and electrical conductivity measurements ensure the nutrient solution's quality remains optimal for melon plants. Testing results demonstrate that the system can operate automatically with high accuracy in pH and electrical conductivity measurements and consistent water filling schedules. The implementation of this IoT system provides a practical solution for farmers to efficiently manage nutrient preparation, minimize human error, and improve productivity and quality in greenhouse melon cultivation.

Keywords: *Internet of Things, Electrical Conductivity, pH, Nutrient Solution, Greenhouse, Melon Plants.*