

ABSTRACT

A common problem in hydroponic melon cultivation is the low efficiency of water and nutrient management. In Kebocoran Village, watering and nutrient application are still done semi-manually, causing a waste of time, energy, and suboptimal water usage. This research aims to develop an Internet of Things (IoT)-based watering and nutrient mixing automation system with the MQTT protocol, to improve the efficiency of hydroponic melon cultivation. The system uses an ESP32 microcontroller connected to two MQTT brokers (HiveMQ and Giotee), and is equipped with a YL-69 humidity sensor, YF-S201 flow sensor, TDS Meter v1.0 Gravity sensor, and DS1307 RTC module. Watering is done automatically based on a schedule and when the humidity is <60%. The system also mixes the nutrient solution with a target concentration of 1470 ppm. Experimental results show that the nutrient mixing system has an average error of 4.23% for nutrient A and 1.25% for nutrient B. Watering showed an average error of 8.52% in polybag 1 and 11.41% in polybag 2. The system is able to maintain the humidity of the growing medium in the range of 60-90% and run the mixer and pump with a stable delay time, thus supporting the efficiency and effectiveness of system operations.

Keywords: *IoT, Humidity, MQTT, Nutrient, Automatic Watering.*