

ABSTRACT

Household organic waste is one of the largest contributors to waste in Indonesia. Composting is one solution to manage organic waste, because it does not cause pollution and produces useful products. The problem with manual composting is that it is difficult to monitor and maintain optimal conditions, it is difficult to know the maturity of the compost, and it requires a large area. This is an obstacle in household-scale composting. To overcome this problem, an IoT-based composting tool was developed that can monitor and control parameters during composting. using ESP32. The system uses ESP32, DHT22 sensor, soil pH sensor, and MQ-4 sensor to monitor compost conditions in real-time. Data is sent to the Blynk and ThingSpeak online databases which are integrated with mobile applications to display data from the online database, so that it can monitor temperature, humidity, pH, and methane gas remotely. The system can automatically activate the fan if the temperature is above 40°C, the pump for water if the humidity is below 40%, the pump for the bioactivator if the pH is below 5.0 to maintain optimal conditions in the minimalist compost container. The results of the system test can accelerate the composting time to 14 days compared to manual composting for 30 days. The accuracy level of the DHT sensor for temperature is 97.52%, for humidity 96.54%, and the soil pH sensor 93.97%, with a throughput of 61.5 Kbps, packet loss 0.1%, delay 54.30 ms, and jitter 13.58 ms, and an average QoS index of 3.5 in the very good category according to THIPON standards. The system successfully detects methane gas to determine the maturity of the compost.

Keywords: *IoT, composting, methane gas, DHT22, MQ-4, soil pH*