

ABSTRACT

Leaf waste at Telkom University is often not utilized properly, so many dry leaves rot or are thrown away. In fact, these leaves can be processed into compost which is useful as organic fertilizer. The main obstacle is the manual process which is time-consuming and labor-intensive, as well as the manual monitoring of the pH and humidity of the leaves. This manual monitoring tends to be inconsistent and labor-intensive, resulting in less than optimal compost processing.

To overcome this problem, this research designed an automated system for leaf composting using pH sensors, moisture sensors, and water pumps. These sensors monitor the condition of the leaves periodically, with the data processed by a microcontroller and sent to the Firebase IoT platform. The system measures the pH and moisture of the leaves, reducing the need for manual monitoring and water spraying. The main objective of the device is to reduce the time and labor required in leaf composting by automating monitoring and spraying, thereby speeding up the leaf composting process.

As a result, this system successfully measures compost quality with a pH sensor error rate of about 1,84% and an accuracy of 98,16%, and a humidity sensor error of about 0,52% with an accuracy of 99,48%. Data is sent periodically to a smartphone application that displays the pH value, humidity, compost classification, and water pump status. The system also shows a small packet loss rate of 0.035%. Based on the condition of the compost, the system can turn on or turn off the water pump automatically to keep the pH of the leaves in the range of 6,5-7,49 and the humidity in the range of 40-60%.

Keywords: Leaf Waste, Leaf Composting, Automatic System, Organic Fertilizer, pH, Leaf Moisture