DEVELOPMENT AND VALIDATION OF LOW-COST MONITORING SYSTEM FOR TEMPERATURE AND MOISTURE IN COMPOST PILES

By

K.H.T.H. Alecxender

Department of Biosystems Technology, Faculty of Technology

Eastern University, Sri Lanka

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ABSTRACT

The objective of this study is to design and test a low-cost compost temperature and moisture monitoring system. Using a soil moisture sensor to measure moisture and a DHT22 sensor to measure temperature, data was gathered over the course of a month. The system was designed to give precise, in-the-moment monitoring in order to maximize composting procedures. The temperature sensor's accuracy was verified using a conventional thermometer, and the results revealed a high correlation coefficient (R) of 0.9988, an RMSE of 0.9820, and an R^2 value of 0.9997. The temperature measurements had an average error rate of 0.965 percent, which is very good agreement with standard measurements. Similarly, an analysis was conducted to compare the effectiveness of the soil moisture sensor with the oven drying technique. The sensor's RMSE was 1.6377 percent, its R^2 value was 0.9868, and its strong correlation coefficient (R) was 0.9948. A high degree of accuracy in tracking the moisture content of compost was indicated by the average percentage error in the moisture measurements, which came in at 2.682. These outcomes validate the low-cost sensors' dependability and accuracy utilized in this investigation. The findings imply that the devised system is a workable and reasonably priced compost monitoring option, with potential uses in commercial and small-scale composting facilities.

Key words – Accuracy, Average percentage error, Composting, Correlation coefficient, Data collection

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