

**MONITORING SYSTEM OF FORCED AERATION COMPOSTING USING
INTERNET OF THINGS (IOT)**

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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and
Biosystems Engineering, College of Engineering, Central Luzon State University,
Science City of Muñoz, Nueva Ecija, Philippines
in Partial Fulfillment of the Requirements
for the Degree of

**BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS
ENGINEERING
(AB Land and Water Resource Engineering)**

JUNE 2023

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ABSTRACT

ANDRES, IVAN MIGUEL D. and **BELTRAN, JORIELLE P.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Munoz, Nueva Ecija, Philippines, **MAY 2023**, **MONITORING SYSTEM FOR FORCED AERATION COMPOSTING USING INTERNET OF THINGS (IOT).**

Adviser: Nicasio C. Salvador, M.Sc.

Composting is an aerobic, or oxygen-driven process by which there is a presence of breaking down of organic materials by microorganisms under controlled conditions of ventilation, temperature & moisture (Dissanayaka et al., 2021). As it undergoes in a process that is enabled by aeration interaction, the temperature indicates the level of degradation or microbial activity happening within a compost pile (Yuan et al., 2018) whereas the supporting moisture content increases the potential of increasing and prolonging adequate temperature suitable for microbial environment (Bosque, S., 2019). Since both manual turning of compost pile and parameter readings in the field consumes an intensive amount of labor and time, accommodating an operation with monitoring principle that has forced aeration mechanism resolves this matter (Pettinger, 2019). Forced aeration by blowers enables a controlling factor of temperature rise and fall (Yuan et al., 2018) to which the temperature is suitable for prolonged presence of microbes (Michel et al., 202) in which would increase respiration of microbes that speeds up the rate at which the composting material breaks down (Mejias et al., 2017).

Using t-test analysis for Two Independent Samples/Groups on the duration profiled by degradation rate of both treatments through temperature and moisture content monitoring throughout the composting operation of developed automated forced aeration

system using sensor controls by which is compared to conventional composting of manual turning was examined within a chamber. It has been found out that there is a significant difference between their durations. Because of that, the percent difference of the monitoring system with forced aeration principle to conventional composting principle was determined and was found out to generate greater in degradation rate which resulted a lesser duration on the whole composting duration of yielding carabao compost as production using this developed system.

Convenience dealt by the features of monitoring principle through Internet of Things (IoT) like the profile of the system can be viewed in the application called *Blynk* by which through the app, the user can view the actual readings which is also automated to form a chart throughout the whole duration of the operation that could go way back as quarterly periods and the user can also control the mechanism of electric blowers in overriding manner of ON/OFF switches.

Keywords: monitoring; forced aeration; composting; temperature; moisture content; internet of things;

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