

Carbon Dioxide Emission from Composting Centre of UiTM Shah Alam

Amirul Hakimi Mohd Salleh & Faeiza Buyong*

Structured Abstract

Background: Carbon emission refers to the amount of carbon, primarily in the form of CO₂, released into the atmosphere. Human activities such as burning fossil fuels, deforestation, and certain industrial processes contribute significantly to these emissions. Organic materials decomposed in composting centres are the major sources of greenhouse gas and air pollutant emissions. From this study, much knowledge on how waste management can be properly done in UiTM Shah Alam composting centre. Measuring the emissions from composting at UiTM Shah Alam helps to determine how the composting process affects climate change.

Methods: Gas samples were collected using a gas chamber placed 2–13 cm above compost and dry leaves, with a propeller ensuring uniform gas flow. Grab air samplers extracted gas every 10 minutes for 30 minutes into a Tedlar bag. Samples were then analyzed using Agilent 7890B GC-TCD. The sample analysis also includes bulk density, volatile matter, pH, ash content and fixed carbon. Result obtained from GC-TCD then calculated to find the flux values.

Results: The findings show that compost has higher moisture content (50.97%), bulk density (0.221 Kg/L), and neutral pH (7.3) compared to dry leaves. Flux calculation includes concentration of gas, hourly flux, daily flux and hectare flux. Compost has the highest hectare flux value of 870.11 kg/ha/h, significantly exceeding the dry leaves of 190.91 kg/ha/h. This indicates compost demonstrates higher emission rates, especially within 20–30 minutes, indicating more intense gas release during composting.

Conclusion: This study concludes how CO₂ emissions from composting at UiTM Shah Alam, by comparing dry leaves and soil compost. Results showed soil compost produced significantly higher CO₂ emissions (699.12 peak area units; 870.11 kg/ha/h) than dry leaves (212.31 units; 190.91 kg/ha/h). Key recommendations include optimizing C:N ratios, maintaining moisture at 40–60%, regular turning, and advanced composting technologies to reduce emissions and support UiTM's low-carbon, sustainable campus goals

Keywords: Composting, Carbon Dioxide, Flux, Bulk density

*Correspondence: faeiza@uitm.edu.my

School of Chemistry & Environment, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia