

Estimation of Carbon Emission From Food Waste in UiTM Shah Alam (2020-2022)

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Structured Abstract

Background: Food waste is a leading contributor to global greenhouse gas emissions, primarily through methane (CH₄) and nitrous oxide (N₂O) released during decomposition. This study focused on estimating the carbon emissions associated with food waste generated at Universiti Teknologi MARA (UiTM) Shah Alam from 2020 to 2022, particularly from Dataran Cendekia and Kolej Delima cafeterias.

Methods: Food waste data were collected from Unit Fasilitas UiTM and analyzed using IPCC Tier 1 methodology. Methane and nitrous oxide emissions were calculated using default emission factors (EF_{CH₄} = 4 kg/tonne; EF_{N₂O} = 0.3 kg/tonne) and global warming potential constants (GW_{PCH₄} = 28; GW_{PN₂O} = 265). Emissions were presented in CO₂-equivalent (CO₂-eq). The study also compared annual emissions with global university benchmarks and examined the effects of COVID-19 on waste generation patterns.

Results: Total food waste increased annually: 116 kg in 2020, 295 kg in 2021, and 700 kg in 2022. Carbon emissions from food waste composting rose from 22.21 kg CO₂-eq in 2020 to 134.05 kg CO₂-eq in 2022. The increase was directly associated with the university's reopening phases post-lockdown. The findings highlighted the potential for universities to reduce emissions by implementing sustainable waste management practices.

Conclusion: This research confirms that food waste contributes significantly to the university's carbon footprint and identifies composting as an effective mitigation strategy. Accurate estimation and effective management of food waste at institutional levels are vital in reducing GHG emissions. The results serve as a basis for encouraging sustainable practices and policy implementation within academic institutions.

Keywords: Food waste, carbon emission, UiTM Shah Alam, IPCC, composting

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