

**Forced Aeration and Bioadditive Impact on Biodrying of Simulated TPA Bantar
Gebang Municipal Solid Waste for RDF Production**

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.


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ABSTRACT

FORCED AERATION AND BIOADDITIVE IMPACT ON BIODRYING OF SIMULATED TPA BANTAR GEBANG MUNICIPAL SOLID WASTE FOR RDF PRODUCTION

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This study assesses the combined effect of forced aeration and bio-additives on the biodrying of simulated municipal solid waste of Bantar Gebang landfill for Refuse-Derived Fuel (RDF) production. Lab-scale reactors were operated for a period of 14 days under four variations for analysis of free moisture reduction, temperature profiles, and microbial population dynamics (Total Plate Count). It was determined that moisture removal was primarily driven by continuous forced aeration, and in the absence of this the matrix retained a high moisture content. Statistical analysis showed that bioadditive application did not significantly affect the final moisture loss and temperature elevation ($p > 0.05$), mainly due to the limitation of system heat loss. However, the bioadditive was successful in functioning as a biological modifier. Inoculated reactors were colonised by microbes rapidly and out-competed indigenous bacteria to change the decomposition pathway, indicated by the shift from a foul smell to a fermentative-sweet smell. In conclusion, forced aeration remained the main driver of moisture removal, while also facilitating microbial growth. The use of bioadditives was successful in inoculation of starting microbes and can be further studied for its logistical benefits in optimizing overall RDF feedstock quality.

Keywords: Biodrying, Refused Derived Fuel, Forced Aeration, Bioadditives, Aerobic Digestion, Municipal Waste Treatment



DEDICATION

I dedicate this work to my parents, my friends, my teachers, and to the hope of a brighter future for the Indonesian Environmental and Energy policy landscape.



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