

Modelling and optimization of biogas generation from sewage sludge using recent Artificial Intelligence techniques



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Research Abstract

This project aims to use computer modelling to analyze correlation between outputs of anaerobic digestion and the system parameters to maximize usable biogas yield and process stabilization. Recent trends in artificial intelligence focusing on nature inspired techniques shall be used to generate the models. Nature inspired techniques are a recently developed branch of artificial intelligence wherein knowledge is transferred from natural systems to engineered systems. These techniques provide a balance between diversity and speed of arriving at the optimal solution which has stimulated their use in anaerobic digestion modeling. For soft computing applications, nature inspired techniques have several advantages such as scope for parallel computing, dynamic behavior, and self-organization. The project will use data from full-scale AD plant and the results of the study will be useful for improving the performance of clean-energy production systems.

Supervisors

Dr Rabee Rustum and Prof. Adebayo J. Adeloye

Publications

Ramachandran, A., Rustum, R. and Adeloye, A.J., 2019. Anaerobic digestion process modeling using Kohonen self-organising maps. *Heliyon*, 5(4), p.e01511. <https://doi.org/10.1016/j.heliyon.2019.e01511>

Ramachandran, A., Rustum, R. and Adeloye, A.J., 2019. Review of Anaerobic Digestion Modeling and Optimization Using Nature-Inspired Techniques. *Processes*, 7(12), p.953. <https://doi.org/10.3390/pr7120953>