

Cfd analysis of slurry flow in an anaerobic digester

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Abstrak

This study uses biogas, an environmentally friendly renewable energy resource, to operate the prototype of a micro-gas turbine (MGT) system called the Proto X-3 Bioenergy Micro-gas Turbine, designed for green building application. The biogas is produced by an anaerobic digester. The aim of this research is to simulate slurry flow in an anaerobic digester as the basis for developing a biogas digester that will produce biogas to meet the requirements of the Proto X-3 Bioenergy Micro-gas Turbine. The digester is a rectangular type with 3.4 m³ capacity. The flow calculations and simulations were done using Computational Fluid Dynamics (CFD) methods in two-dimensional, body-fitted coordinate mesh. The simulations were conducted with various baffle clearances for the digester: 50 mm, 100 mm, and 150 mm. The CFD simulations showed that the recirculation phenomena was found in all flows but that the 50-mm baffle clearance model had the largest recirculation, and it would lead to better mixing of the slurry.