World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:11, No:05, 2017

# Scaling-Down an Agricultural Waste Biogas Plant Fermenter

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**Abstract :** Scale-Down rules in process engineering help us to improve and develop Industrial scale parameters into lab scale. Several scale-down rules available in the literature like Impeller Power Number, Agitation device Power Input, Substrate Tip Speed, Reynolds Number and Cavern Development were investigated in order to stipulate the rotational speed to operate an 11 L working volume lab-scale bioreactor within industrial process parameters. Herein, xanthan gum was used as a fluid with a representative viscosity of a hypothetical biogas plant, with H/D = 1 and central agitation, fermentation broth using sewage sludge and sugar beet pulp as substrate. The results showed that the cavern development strategy was the best method for establishing a rotational speed for the bioreactor operation, while the other rules presented values out of reality for this article proposes.

**Keywords :** anaerobic digestion, cavern development, scale down rules, xanthan gum
**Conference Title :** ICSWMRPI 2017 : International Conference on Solid Waste Management, Recycling Practices and Incineration
**Conference Location :** Berlin, Germany
**Conference Dates :** May 21-22, 2017