Kinetic model development for biogas production from lignocellulosic biomass

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Abstrak

Lignocellulosic biomass has great potential for biogas production, but there are various factors which affect the performance of lignocellulosic biomass. Among the various factors, temperature is one of the important factors which play a significant role in biogas production from lignocellulosic biomass. Biogas production was studied for bamboo dust, sawdust, sugarcane bagasse and rice straw, all separately mixed with cattle dung. The effect of temperature on biogas production from various lignocellulosic biomasses was studied for temperature range from 35°C to 55°C at steps of 5°C. The objective of this work is to develop a mathematical model for evaluating the effect of temperature on the rate of biogas production from various lignocellulosic biomasses. The new mathematical model is derived by modification of the modified Gompertz model. The new model is found to be suitable for lignocellulosic biomass mixed with cattle dung in the temperature range 35°C to 55°C. The resulting estimated biogas production is found to be highly correlated to the experimental data of present study.