



A simplified kinetic model for a full scale anaerobic wastewater treatment plant of a sugar factory under unsteady conditions

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ABSTRACT

A simplified time dependent mathematical model was developed for an industrial a full-scale two stage anaerobic wastewater treatment plant of a sugar factory under unsteady conditions. As an overall approach, a two-step (acidogenesis and methanogenesis) instantaneous mass balance was considered in the model. The reactor equations employed were based on continuous flow well-mixed conditions. Kinetic parameters related to acidogenic and methanogenic reactions were imported from literature studies. The kinetic model was used to simulate MLVSS (mixed liquor volatile suspended solids), VFA (volatile fatty acid) and COD (chemical oxygen demand) equivalent glucose concentrations in hydrolysis tank, and MLVSS, VFA and gas production in anaerobic tank by making use of data from the full-scale anaerobic methane production plant. The model satisfactorily predicted the measured variables in the hydrolysis tank, but prediction was poor for variables in the anaerobic tank. The model has limitations in anaerobic reactions, which are basically due to model kinetic parameters unspecific to sugar factory wastewater.

Keywords: Anaerobic treatment; Kinetic modeling; Sugar industry

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