



Kinetics with optimization studies of nitrogen and organic elimination from wastewater via heterotrophic biomass conversion process

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ABSTRACT

Heterotrophic biomass conversion (HBC) research was carried out for the removal of N-NH₃ and organic carbon from synthetic wastewater. Ammonium nitrate and glucose were used as the nitrogen and organic carbon source, respectively. In this study, N-NH₃ and organic nutrient concentrations were varied, keeping the biomass concentration invariable. The kinetics followed dual rates, i.e. faster initial rate followed by a slower one. The consumption of N-NH₃ and COD followed first-order kinetics. Kinetic model such as Monod was studied. The pH during the HBC process showed an increasing trend which may be due to heterotrophic nitrification (HN). Parameters like N-NO₃⁻, N₂O, N-NO₂⁻, time, and dissolved oxygen were studied. A part of N-NH₃ utilized for the emission of N₂O may be due to HN. Analyses of variance were carried out for better interpretation of results. Optimization studies were carried out to minimize N₂O emission and maximize N-NH₃ along with COD removal.

Keywords: HBC; Kinetics; Monod; Diffusion; Optimization; Statistics

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