

Phenolic wastewater: Effect of F/M on anaerobic degradation

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ABSTRACT

Effect of the ratio of food to microorganism (F/M) ranging from 0.25 to 2.0 and nature of sludge on methanogenesis of phenol in the batch reactors has been evaluated. Unacclimatized flocculant sludge and acclimatized granular sludge were used as seed inocula (microorganisms) in two different sets of experiments. The degradation profiles of phenolic COD conformed to logistic growth model. Lag phases of 10 days with flocculant sludge and upto 32 days with granular sludge followed by accelerated rate of CH₄ generation were noticed. Methane generation rate constant (k) has been found to vary from 0.17 to 0.21 d⁻¹ and 0.10 to 0.18 d⁻¹ with flocculant and granular sludges respectively. The F/M ratio also influenced the biochemical methane potential (μ_b) and the sludge activity [mL CH₄ or g CH₄-COD formed/g VSS (sludge)]. μ_b at 80 days (μ_{b80}) with flocculant sludge ranged from 0.18 to 0.95 while μ_b at 112 days (μ_{b112}) with granular sludge ranged from 0.80 to 1.04. μ_{b80} was maximum at F/M = 0.75. The trend of sludge activity was also found similar to that of k and μ_{b80} .

Keywords: Anaerobic treatment; Sludge; Phenol; Reactors; Industrial waste

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