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Synergistic impact of sonic - tenside on biomass disintegration potential: acidogenic and methane potential studies, kinetics and cost analytics

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Abstract

An exploration into the symbiotic impact of sonic-tenside (SDBS - sodium dodecyl benzene sulfonate) on biomass disintegration potential and to reduce the energy consumption was studied. At optimized condition (specific energy input 9600 kJ/kg TS; SDBS dosage 0.07 g/g SS), higher percentage of biomass lysis and solids reduction (23.9 % and 19.8 %) was obtained in blended sonic-tenside disintegration (STD), than sonic disintegration (SD) (17.6 % and 9.8 %). The bioacidogenic potential (BAP) assay in terms of volatile fatty acids (VFA) production (722 mg/L) was found to be higher for STD, in comparison to SD (350 mg/L). The impact of STD on anaerobic digestion was evident from its methane yield (0.239 g/g COD), higher than SD (0.182 g/g COD). A monetary evaluation of the present study provides a net gain of 2 USD/ton for STD, indicating the profitability of the technique.

Keywords: sonication; disintegration; biomass lysis; specific energy; methane.

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1. Introduction

One of the foremost threats in the treatment of wastewater and handling of surplus waste activated biomass requires treatment cost about 60 % of the total expense of wastewater treatment process (Yan et al., 2013). Since biomass treatment costs a great deal, a growing interest exists in decreasing the quantity of biomass generated in the wastewater treatment process (He et al., 2016). One of the cost-efficient method to biomass management is anaerobic

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