

Application of ultrasound to control and enhance performance of dynamic membrane in anaerobic bioreactor

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The concept of Dynamic Membrane (DM) where the fouling layer itself is used as the retaining medium could be used as the possible solution for countering the problems encountered in membrane bioreactor processes. Anaerobic DM gives high filtration resistance even at moderate flux within a short period of time. In this study, a novel concept of using ultrasound to control and enhance dynamic membrane performance was studied. Two reactors with an ultrasound probe in the center of one reactor were run simultaneously. The concept of steady Flux Decay Ratio (FDR) and analytical methods like extracted Extracellular Polymeric Substance (EPS), soluble microbial product analysis, Scanning Electron Microscopy (SEM), Fourier Transform Infrared (FTIR), Particle Size Distribution (PSD), Dehydrogenase Activity (DHA), Specific Methanogenic Activity (SMA) and Chemical Oxygen Demand (COD) analysis were used in this study. Lower filtration resistance (20), increased flux (10-12 L/m²h), lesser blocking degree of 62% FDR, more stickier and compact dynamic membrane layers, enhanced microbiological activity and COD removal (95%) were observed. All results indicated that the dynamic membrane formed with ultrasound application was less severely blocked more compact, microbiologically active and efficient compare to without ultrasound.

Biography

Alka A Mungray is an Assistant Professor in Chemical Engineering Department, SVNIT, Surat. Her research area is membrane separation process, wastewater treatment, microbial fuel cell (MFC), polymer nanocomposite, polymer degradation, forward osmosis and osmotic microbial fuel cell (OMFC). She has published/presented 40 papers in international journals and conferences.

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