

Anaerobic co-digestion of different wastes in a UASB reactor

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ABSTRACT

Anaerobic co-digestion has made a greater impact on the biogas production from mixing different type of waste. In this research, sewage sludge (SS) and cow manure (CM), was used as a primary waste along with kitchen waste (KW), yard waste (YW), floral waste (FW) and dairy wastewater (DWW) as co-substrate for anaerobic digestion. Mixtures with a ratio of 1:2 ratio is fed into a single stage up-flow anaerobic sludge blanket (UASB) reactor. Digestion was carried out in a mesophilic temperature range for 20 days. pH and VFA were measured and ranged from 5 to 7.5 and 3500–500 mg/L, respectively, for all the mixtures throughout the digestion period. Percentage of COD removal efficiency after 20 days was found to be in the range of 76–86%. The maximum biogas production rate was found to be 4500 mL/day. Characterization of the final residue from each of the digesters was carried out by Scanning Electron microscope, Energy dispersive, thermogravimetric, FTIR Spectra, and Atomic microscope. Thermal analysis reveals that spent sludge can be potential waste energy sources.

KEYWORDS: Anaerobic; Sewage sludge; Dairy wastewater; Cow manure; UASB; Kitchen waste