Potential of pineapple waste extract (PWE) as co-substrate in anaerobic digestion of rice straw washwater (RSWW): enhancement of biogas production

ABSTRACT

This study aims to investigate the potential methane yield by mono-anaerobic digestion of rice straw washwater (RSWW) and pineapple waste extract (PWE) as well as the co-digestion of both RSWW and PWE at a ratio of 50:50 (v/v). The experiment was conducted at a controlled mesophilic temperature of 37 °C in Upflow Anaerobic Sludge Blanket (UASB) reactor for a period of approximately 55 days. The process performances were evaluated based on the efficiency of COD removal and methane production in relation to other parameters such as pH, organic loading rate (OLR) and alkalinity ratio. This study confirmed that the rate of COD removal for RSWW, PWE, and RSWW:PWE (50:50) were achieved the stable condition at 81, 89, and 86% respectively. The alkalinity ratio value and pH throughout the experimental period remained below 0.30 and kept in the range of 6.5ï 7.0 indicated the stable and good environment existed for anaerobic digestion within the UASB reactor. This study implies that the co-digestion of RSWW:PWE found to improve the efficiency of COD removal and production of methane during the mono-digestion of RSWW from 81 to 86% and 0.093 to 0.13 LCH4/g CODrem by the increment of 6.2 and 40%, respectively.

Keyword: Anaerobic co-digestion; Chemical oxygen demand; Methane production; Pineapple waste extract; Rice straw washwater