

Effect of carbon to nitrogen ratio of food waste on biogas methane production in a batch mesophilic anaerobic digester

Abstract

Food waste mixture at carbon to nitrogen (C/N) ratio 17 was combined with meat, fruits and vegetable wastes to increase its C/N ratio to 26 and 30 before anaerobic digestion. Results showed that biogas methane yield obtained during the digestion increased from 0.352L/gVS, 0.447L/gVS and finally to a maximum yield of 0.679 L/gVS at C/N ratio of 17, 26 and 30, respectively. A maximum food waste treatment efficiency of 85% was obtained at C/N ratio 30. Generally, increase in C/N ratio through co-digestion resulted in a more stable pH and better methanogenic activity due to enhanced buffering effect of the digestion medium.

Keyword: Biogas methane; Batch digester; Carbon to nitrogen ratio; Food waste; Mesophilic digester