IMPACT: Journal of Modern Developments in Natural Sciences Research (IMPACT: JMDNSR)
Vol. 1, Issue 1, Jun 2017, 15-26

CHARACTERISATION OF FRUIT AND VEGETABLE WASTE WITH COW DUNG FOR MAXIMIZING THE BIOGAS YIELD

MASSRESHAW ASSNAKEW ABEBE

Lideta Sub city Cleansing Management office, Lideta subcity, Addis Ababa, Ethiopia

ABSTRACT

This work investigates the biogas production and methane (CH_4) enrichment for anaerobic digestion (AD) of fruit and vegetable waste (FVW). The effect of pH and temperature were studied using a lab scale batch anaerobic digester. The raw biogas was pebbled through water, NaOH, for biogas purification and CH4 enrichment. The results showed that mixed fruit waste (MFW) provides 10% more biogas yield than mixed fruit vegetable waste (MFVW). The use of NaOH, increased CH4 enrichment upto 5 %, Biogas having 71% CH4 contents with 28% reduced CO_2. Anaerobic digestion; vegetable and fruit wastes of high calorific contents can be transformed to a source of energy through the production of biogas in this day and age of energy insufficiencies. Role in maximizing the process of anaerobic digestion through speeding up hydrolysis and to compare production potentials of commonly available wastes in Addis Ababa for possible co-digestion in large scale production of biogas. Thermo-chemical pre-treatment was the most effective for speeding up hydrolysis with the co-digested substrates producing maximum biogas. The moisture content ranged between 67-83%. The pH reduced from 6.8-7.2 before digestion to 6.2-6.8 after digestion. The desired C: N ratio was between 18:1 to 32:1 for Anaerobic Digestion. The gas produced was found to contain 63.89% methane, 33.12% CO_2 and 3% other gases.

KEYWORDS: Anaerobic Digestion, Co-Digestion, and C: N Ratio, Hydrolysis, and Substrate Pre-Treatment