

Name of Research Scholar: Neelam

Roll No – 14PhDCS10

Name of Supervisor: Dr. Abid Ali khan and Prof. Kafeel Ahmad

Department: Department of Civil Engineering, Jamia Millia Islamia, New Delhi

Research Topic: A COMPARATIVE STUDY ON BIOMETHANATION OF SUGARCANE BAGASSE ALONG WITH OTHER WASTES UNDER VARIABLE CONDITIONS

Keywords: Anaerobic digestion, pre-treatment, kinetic models, multiple inocula, batch study

Abstract

Sugarcane bagasse (SB) is a plentiful product obtained from sugar industry which is inexpensive, abundant, renewable and rich in energy potential. In the present study, efforts have been made to investigate biogas production from pre-treated and untreated SB co-digestion with food waste (FW), fruit - vegetable waste (FVW), Poultry Waste (PW) and garden waste (GW) at different feedstock ratio and to study effect of different feedstock ratio.

Experiments were carried out under ambient conditions in 500 mL volumetric flask. The wastes (SB, FVW, FW, PW, cow dung (CD), Waste Activated Sludge (WAS)) were brought from nearby juice shops, poultry farms, treatment plants. The wastes were grinded into smaller fractions and stored in refrigerator at 4 °C till further analysis.

Results obtained stated that mono-digestion of different studied biomass is not preferable to obtain balanced C/N ratio. Results demonstrate that the fruit-vegetable waste and poultry droppings yield the highest amount of biogas using waste activated sludge as an inoculum than the other wastes. Untreated SB was co-digested with FW, FVW, PW and MI. The biogas generation of upto 169% was observed with an increase in food waste of 65% from co-digestion of SB. In thermal pre-treatment of SB with FW, PW and with multiple inoculum (MI), maximum biogas of 11666 mL was obtained in MI study in T4 reactor (MI + T. GW + PW) followed by SB + FW study (35SB: 65FW) with 10424 mL of biogas.