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CH_4/g VS_{FW} in comparison with the other controls. The energy balance investigated the electricity generated and the net heat output generated, in addition to self-sustaining and meeting the energy requirements of the various AD processes investigated. Based on the analysis, it was found the semi-continuous mixing is more energy efficient and sustainable to generate sufficient biogas output for the energy system to provide a net positive heat and electricity output. The original digestate from this 1000L anaerobic digester, heat treated digestate and chemical fertilizer are used for cultivation of vegetables. The results showed that the interaction between heat treatment and digestate concentration is significant, so the trend-lines for the different types of digestate are different. The treatment with the highest yield was also compared with the control treatment (chemical fertilizer, 15N:15P:15K, 1.2 g per application) using t-test. The yield of the best performing digestate is not significantly different from the control. It means that the performance of digestate is almost same to the use of chemical fertilizer.

Preparation of Nanocarbon from Bioenergy Waste Derived Biochar through Mechanized Grinding for the Removal of Pharmaceuticals from Aqueous Media.

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Biochar has received recent attention as an excellent adsorbent in the removal of emerging contaminants from water. Similarly, high surface area of the nanoparticles increase the adsorption capacity of the material. Therefore the objective of this study is to prepare nanocarbon from bioenergy waste derived biochar through mechanized grinding. Dendro biochar, which is a solid waste from the dendro-power industry was used to prepare nanocarbon for the removal of antibiotic Oxytetracycline (OTC) from aqueous media. Biochar was mixed with ethanol and ball milled for 6 hrs around 5000 rpm with 30 minutes intervals for every 1.5 hrs. Resulted nanocarbon was characterized by using powder x-ray diffraction (PXRD), Fourier transform infrared spectroscopy (FTIR) and Nanoscale Particle Size Analyzer. Adsorption edge experiment was carried out from pH 4 to 9 at a dosage of 1 g/L nanocarbon and antibiotic oxytetracycline was analyzed by using UV/Vis spectrophotometer at the wavelength of 354 nm. The particle size of nanocarbon was in the range of 15 to 414 nm. Adsorption of 17 mg/L of oxytetracycline in 24 hrs was observed at pH 4 from a solution with 25 mg/L of concentration. The PXRD pattern for biochar confirmed the amorphous nature of biochar and a poorly crystalline solid, which further revealed a noticeable reflection at 2q = 24° that shows the presence of SiO_2 in the material. Transmittance spectra for the pristine biochar evidenced the functional groups present in the material. Intense peaks at the fingerprint area is accountable due to the presence of aromatics (1650 cm^{-1}) and the presence of C-H bending at 1000 cm^{-1} which confirmed further the aromaticity in the biochar. Hence the results indicate that the nanocarbon produced by dendro biochar is being promising for the removal of OTC from aqueous media.

Comparison of Different Start-up Strategies for Thermophilic Anaerobic Digestion: Process Stability and Microbial Community Structure Shifts.

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