

Characterization of Banana (*Musa spp.*) Pseudo-Stem and Fruit-Bunch-Stem as a Potential Renewable Energy Resource

Authors : Nurhayati Abdullah, Fauziah Sulaiman, Muhamad Azman Miskam, Rahmad Mohd Taib

Abstract : Banana pseudo-stem and fruit-bunch-stem are agricultural residues that can be used for conversion to bio-char, bio-oil, and gases by using thermochemical process. The aim of this work is to characterize banana pseudo-stem and banana fruit-bunch-stem through proximate analysis, elemental analysis, chemical analysis, thermo-gravimetric analysis, and heating calorific value. The ash contents of the banana pseudo-stem and banana fruit-bunch-stem are 11.0 mf wt.% and 20.6 mf wt.%; while the carbon content of banana pseudo-stem and fruit-bunch-stem are 37.9 mf wt.% and 35.58 mf wt.% respectively. The molecular formulas for banana stem and banana fruit-bunch-stem are $C_{24}H_{33}NO_{26}$ and $C_{19}H_{29}NO_{33}$ respectively. The measured higher heating values of banana pseudo-stem and banana fruit-bunch-stem are 15.5MJ/kg and 12.7 MJ/kg respectively. By chemical analysis, the lignin, cellulose, and hemicellulose contents in the samples will also be presented. The feasibility of the banana wastes to be a feedstock for thermochemical process in comparison with other biomass will be discussed in this paper.

Keywords : banana waste, biomass, renewable energy, thermo-chemical characteristics

Conference Title : ICEBWE 2014 : International Conference on Energy, Biomass and Waste Engineering

Conference Location : Istanbul, Turkey

Conference Dates : August 18-19, 2014