

Effect of Core Puncture Diameter on Bio-Char Kiln Efficiency

Authors : W. Intagun, T. Khamdaeng, P. Prom-ngarm, N. Panyoyai

Abstract : Biochar has been used as a soil amendment since it has high porous structure and has proper nutrients and chemical properties for plants. Product yields produced from biochar kiln are dependent on process parameters and kiln types used. The objective of this research is to investigate the effect of core puncture diameter on biochar kiln efficiency, i.e., yields of biochar and produced gas. Corncobs were used as raw material to produce biochar. Briquettes from agricultural wastes were used as fuel. Each treatment was performed by changing the core puncture diameter. From the experiment, it is revealed that the yield of biochar at the core puncture diameter of 3.18 mm, 4.76 mm, and 6.35 mm was 10.62 wt. %, 24.12 wt. %, and 12.24 wt. %, of total solid yields, respectively. The yield of produced gas increased with increasing the core puncture diameter. The maximum percentage by weight of the yield of produced gas was 81.53 wt. % which was found at the core puncture diameter of 6.35 mm. The core puncture diameter was furthermore found to affect the temperature distribution inside the kiln and its thermal efficiency. In conclusion, the high efficient biochar kiln can be designed and constructed by using the proper core puncture diameter.

Keywords : anila stove, bio-char, soil conditioning materials, temperature distribution

Conference Title : ICBAE 2018 : International Conference on Biotechnology and Agricultural Engineering

Conference Location : Tokyo, Japan

Conference Dates : May 28-29, 2018