PERFORMANCE ANALYSIS OF A DOWN DRAFT BIOMASS STOVE

By

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DECLARATION

I hereby declare that this submission is my own work and that to the best of my knowledge and behalf, it contains no material previously published or written by another person or material, which to substantial extent, has been accepted for the award of many other academic qualification of a university or other institute of higher learning except where acknowledgment is made in the text.

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ABSTRACT

The temperature variations of a biomass down draft batch feeding stove is analyzed. Down draft stoves are becoming more popular due to its low emission and high thermal efficiency. The principle of operation of the stove, in contrast to conventional designs is that the flow of air is in the same direction as the volatiles and fuel. Temperature distribution of the stove is important, because it has a direct relation with batch feeding. To explore the capability of using down draft stoves for other than cooking is very important and for that the temperature variation inside the stove has to be analyzed. A 150 mm X 150 mm grate size biomass stove is used and the chimney height is 1.5 m. Diameter of the chimney is 88mm and the average of 750 g of wood can be feed for a batch. Heat exchanger is used to extract heat form the chimney and the used air flow rate through the heat exchanger is 45 cm^3/S. The thermocouples are placed under the grate in-between grate and under the chimney inlet and on top of chimney outlet. And the temperature readings were plotted against time. Maximum temperature of 800 C is recorded in-between chimney and grate. And the all the temperatures shows an oscillation behaviour, showing maximum temperature during the middle of the feeding cycle and decreasing gradually.

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