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Performance assessment of improved version of cook stoves

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Abstract : Biomass is the organic matter produced by plants. Incomplete combustion of biomass fuel generate high levels of indoor pollutant gases like CO, NO_2, SO_2, Sulphur oxides etc. A modified version of the traditional cook stoves is the improved cook stove in which the biomass is burnt more efficiently with respect to fuel consumption, thermal efficiency and also makes them convenient for cooking and much safer from a health point of view. The thermal efficiency of single pot Chetak and double pot Udairaj improved cook stoves was 23.34 and 24.30 per cent, respectively as compared to that of 12.20 per cent for traditional cook stove. The combustion efficiency of single pot Chetak and double pot Udairaj improved cook stoves were 62.3 and 81.8 per cent, respectively while it was 56.4 per cent for traditional cook stove. So it is concluded that the improved cook stoves are more efficient than traditional cook stoves for thermal applications.

Key words : Biomass, Thermal efficiency, Improved cook stoves

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The majority of the households in the developing countries like India, use biomass fuels such as wood, dung and other fibre residues on a daily basis for cooking and heating (World Resources, 1998). Smoke from biomass combustion contains high levels of indoor pollutants which may be harmful to the health of the exposed individuals. India bears one of the largest burdens of disease due to the use of unclean household fuels (Smith *et al.*, 2000). The exposure was found to be highest in women and young children groups in both rural and urban groups of developing countries. Rathore and Jain (2001) developed single and double pot improved cook stoves for rural and tribal people. They reported that the thermal efficiency of these improved cook stove was in the range of 21.78 – 29.08 per cent. Spautz *et al.* (2006) reported that the parameters like thermal efficiency, combustion efficiency, concentration of carbon monoxide and carbon dioxide are the main criteria for evaluating the performance of cook stoves. Desai *et al.* (2007) studied the adoption of improved cook stoves by rural women of Raichur region. They reported that the thermal efficiency of Udairaj improved double pot cook stove varied from 24-26 per cent as compared to 10-12 per cent for traditional cook stoves. The power output rating of the improved cook stoves was 1.42 kW while it was 0.98 kW for traditional cook stoves.

METHODOLOGY

Constructional details of cook stoves:

Single pot chetak cook stove:

The single pot chetak cook stove was constructed using cement, brick and sand. The dimensions and specifications are given in the line diagram shown in Fig. A.

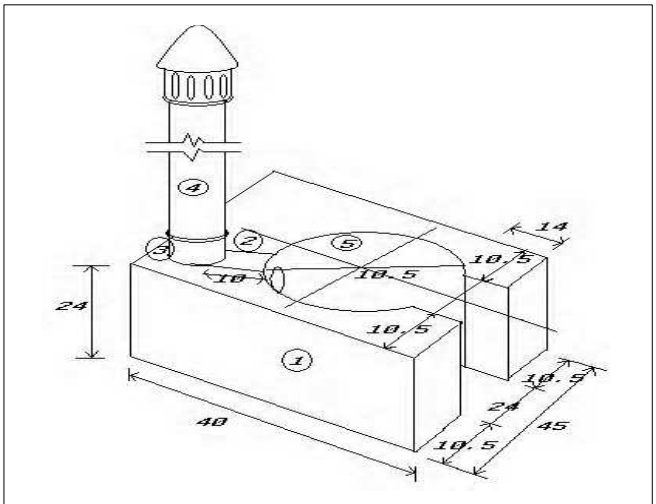

Fig. A : Single pot Chetak cook stove