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Air gasification of rice husk in bubbling fluidized bed reactor with bed heating by conventional charcoal

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**Abstract**

An experimental study of air gasification of rice husk was conducted in a bench-scale fluidized bed gasifier (FBG) having 210 mm diameter and 1600 mm height. Heating of sand bed material was performed using conventional charcoal fuel. Different operating conditions like bed temperature, feeding rate and equivalence ratio (ER) varied in the range of 750-850°C, 25-31.3 kg/h, and 0.3-0.38, respectively. Flow rate of air was kept constant (37 m<sup>3</sup>/h) during FBG experiments. The carbon conversion efficiencies (CCE), cold gas efficiency, and thermal efficiency were evaluated, where maximum CCE was found as 91%. By increasing ER, the carbon conversion efficiency was decreased. Drastic reduction in electric consumption for initial heating of gasifier bed with charcoal compared to ceramic heater was ~ 45%. Hence rice husk is found as a potential candidate to use directly (without any processing) in FBG as an alternative renewable energy source from agricultural field.

**Keywords:** Air Gasification, Fluidized bed gasifier, Rice husk, dolomite, charcoal heating

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