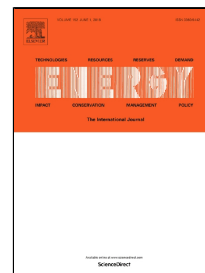


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Comparative study of native and impregnated coconut husk with pulp and paper industry waste water for fuel gas production

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Abstract

Coconut husk was treated with pulp and paper industry wastewater for impregnating metal constituents present in it. The present work was focused on humidified air as an alternative to steam for generation of hydrogen-rich fuel gas in an updraft fixed-bed gasification column. A series of experiments were performed to see the effect of temperature, air/humidified air and CO₂ addition on gas yield and composition. Furthermore, some experiments were also conducted by varying impregnation temperature at the optimum condition to see the effect of impregnation temperature on gas yield and calorific value. The gross calorific value (GCV) of coconut husk C_{53.84}H_{77.80}O_{43.99}N was estimated as 23.21 MJ/kg. The fuel gas production was found in the range from 0.68 to 2.89 Nm³/kg for native and from 0.83 to 3.13 Nm³/kg for impregnated coconut husk. The GCV of fuel gas yield was found to be maximum of 12578 kJ/Nm³ for impregnated coconut husk at impregnation temperature of 105 °C, retrofitted with CO₂ in humidified air. The concentration of hydrogen was found maximum for impregnated coconut husk. The present gasification process not only provides feasibility of green energy but also renders to reduce the pressure of the environmental pollution created by the unutilized coconut husk.

Keywords: coconut husk; native and impregnated; gasification column; humidified air; fuel gas.

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