## Catalytic cracking of biomass using zeolite catalyst: Characterization of pyrolytic oil

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## ABSTRACT

In-situ catalytic pyrolysis of Custard seed was performed in this study. The yield of biomass pyrolytic products (thermal) with respect to pyrolysis temperature was observed in the range of 400 °C - 600 °C with a heating rate of 50 °C min<sup>-1</sup> under 25 mL min<sup>-1</sup> nitrogen flow rate. The optimum yield of thermal pyrolytic oil (60.20 wt. %) was obtained at 500 °C. Catalytic pyrolysis using zeolite were performed at 500 °C at different wt. % of catalyst. The catalytic pyrolysis yielded 62.43 wt. %, 65.28 wt. % and 68.17 wt. % of pyrolytic oil at 1%, 2%, 5% of catalytic loading respectively. Catalytic pyrolysis enhanced the fuel properties by increasing the calorific value and by reducing the density, viscosity and Conradson carbon residues. The presence of water, acids, ester, aromatics and phenol functional groups were confirmed by FTIR spectra of pyrolytic oil. The compositional analysis of pyrolytic oil confirmed the interaction of zeolite during pyrolysis by resulting the hydrocarbon rich pyrolytic oil with reduced oxide and acid compounds. So, in-situ catalytic pyrolysis of biomass with zeolite can be an option for biomass pyrolytic oil.

Keywords: Custard seed; Pyrolysis; Zeolite; TGA; FTIR; GC-MS

