

# Impact of $\text{Al}_2\text{O}_3$ on Biochar Quality in Biomass Pyrolysis Using a Fixed-Bed Reactor

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## Abstract

Pyrolysis is one of the most efficient methods for transforming biomass into valuable products such as bio-oil, biochar, and syngas. These products have applications across various sectors, including transportation, agriculture, and cosmetics. Biochar is particularly valued for its numerous advantages: low cost, environmental friendliness, and high stability. Biochar is formed during pyrolysis by decomposing raw materials in an inert environment. This process involves polymerization and carbonization, resulting in stable aromatic structures. Due to its porosity and high carbon content, biochar can also be used as a soil amendment, helping to reduce acidity and increase fertility. Additionally, it has applications in wastewater treatment and as a catalyst in various processes. This work aims to determine the effect of temperature and particle size and the impact of adding catalysts like  $\text{Al}_2\text{O}_3$  on the yield and quality of the biochar produced. Aspects studied include morphology, calorific value, and pH. These analyses will be performed using different methods such as IR, SEM-EDX, XRD, and elemental analysis.

## Keywords

Pyrolysis, Catalyst, Biochar, Temperature, Particle Size,  $\text{Al}_2\text{O}_3$