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## Element Characteristic Tolerance for Semi-batch Biomass Pyrolysis

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### Abstract

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Biomass pyrolysis to bio-oil is one of the promising sustainable fuels. In this work, relation between biomass feedstock element characteristic and crude bio-oil production yield and lower heating value was explored. The element characteristics considered in this study include moisture, ash, fix carbon, volatile matter, C, H, N, O, S, cellulose, hemicellulose, and lignin content. A semi-batch fixed bed reactor was used for biomass pyrolysis with heating rate of 30 °C/min from room temperature to 600 °C and the reactor was held at 600 °C for 1 hour before cooling down. Constant nitrogen flow (1bar) was provided for anaerobic condition. Sago and Napier grass were used in the study to create different element characteristic of feedstock by altering mixing ratio. Comparison between each element characteristic to crude bio-oil yield and low heating value was conducted. The result suggested potential key element characteristic for pyrolysis and provide a platform to access the feedstock element acceptance range.