

## EVALUATION OF THE EFFICIENCY OF A THERMOCHEMICAL REACTOR FOR WOOD PYROLYSIS

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### ABSTRACT

The evaluation of the efficiency of a thermochemical reactor for wood pyrolysis is presented in this paper. Biomass from seven tropical wood species; Obeche (*Triplochiton scleroxylon*); Iroko (*Melicia excelsa*); Danta (*Nesogordonia papaverifera*); Mahogany (*Khaya ivorensis*); Omo (*Cordia platythyrsa*); Mansonia (*Mansonia altissima*) and Afara (*Terminalia superba*) retrieved from sawmills were pyrolysed in a fixed-bed batch thermal reactor. Thermodynamic principles were used to obtain the reactor efficiency at varying temperatures. Linear regression analysis was done and regression trend equations were written, with which the reactor temperatures were calculated. There were highly significant linear correlation between the pyrolysis experimental temperatures and the calculated temperatures. The correlation coefficients of 95.50% for Product Temperature, 91.00% for the Reactor Efficiency at generating gas, and 71.60% for the Reactor Thermal Efficiency. These give an overall average of 86.00% for the reactor. It was concluded that the thermochemical reactor is highly efficient.

**Keywords:** Thermochemical, pyrolysis, reactor, efficiency, fixed-bed.