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**Fourier Transform Infrared (FTIR) Study and Thermal Decomposition Kinetics of *Sorghum bicolour* Glume and *Albizia pedicellaris* Residues**

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**Abstract**

An investigation into the thermal decomposition kinetics, by thermogravimetric analysis, of an agricultural and a forestry residue was carried out using distributed activation energy model (DAEM) and Friedman’s differential technique. Preliminarily, Fourier transform infrared spectroscopy alongside proximate, ultimate and heating value was used in the characterisation of the biomass resources. The characterisation experiment showed differences between *Sorghum bicolour* glume (SBG) and *Albizia pedicellaris* (AP). The activation energy (*E*) showed a significant variation as conversion progresses; recording *E* using DAEM for AP (169–291 kJ mol−1) and for SBG (212–283 kJ mol−1), while *E* (Friedman’s model) for AP (188–314 kJ mol−1) and SBG (163–280 kJ mol−1). The correlation coefficients obtained for both models (DAEM; R2 ≥ 0.976, Friedman; R2 ≥ 0.971) were high; attesting to the suitability of the models. The reaction order *n* was also evaluated as a function of temperature based on Avrami’s theory. The average values (0.209 and 0.195) of *n* obtained for AP and SBG, respectively were found to be lower than those from literature. This places emphasis on the probable effect of biomass complex structure on the reaction order in biomass thermochemical conversion process.

**Keywords**

DAEM Friedman’s technique Reaction order Biomass Decomposition kinetics

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**Notes**

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