

## **A Preliminary Study of Pyrolysis Kinetics among Various Types of Oil Palm Wastes**

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### **Abstract**

Oil palm waste such as empty fruit bunch (EFB), mesocarp fibre (MF) and palm kernel shell (PKS) are some of the abundant wastes produced by oil palm mills which have great potential to replace fossil fuel through the application of thermochemical processes like torrefaction which produces solid biofuel and pyrolysis that produces bio-oils. The study of the kinetics of a reaction indicates the activation energy and frequency factor of the reaction are often applied in the design of a reactor. In this study, the kinetics of pyrolysis of oil palm wastes were investigated with the aid of a derivative thermogravimetric graph (DTG) using thermogravimetric analyzers. Model-fitting methods including Arrhenius, Coats-Redfern (CR) and Kennedy-Clarke (KC) models were applied to obtain the kinetic parameters which are activation energy (E) and pre-exponential factor (A). As a result, it is clear that the CR model provides the most accurate estimates of the kinetics of the pyrolysis of oil palm wastes.

*Keywords:* Pyrolysis; Kinetics; Model-fitting methods; Oil palm waste.