

## Evaluation of oil palm waste mild pyrolysis kinetic parameters

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### ABSTRACT

With the goal of contrasting model-fitting and model-free methods for the kinetics of mild pyrolysis for empty fruit bunches (EFB), EFB were thermal decomposed and the profile was analysed using thermalgravimetric analysis (TGA). Coats-Redfern (CR) and Kissinger-Akahira-Sunose (KAS) methods were selected to represent model-fitting and model-free methods respectively. The activation energies ( $E_a$ ) calculated for CR ranged between 22.45 and 26.31 kJ mol<sup>-1</sup> (regression coefficient,  $R^2$  of 0.93 to 0.95) while the average  $E_a$  for KAS was 3.98 kJ mol<sup>-1</sup>. Compared with other typical model fuels, the mild pyrolysis of EFB from this work shows higher thermal instability, hence more reactive compared to previous works. Furthermore, the KAS method is more reliable in representing the mild pyrolysis process due to its higher overall regression coefficients showing that the assumptions of the KAS method are more accurate.

### KEYWORDS

Oil palm waste; Pyrolysis kinetics; Model-fitting method; Model-free method

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