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Determination of kinetic parameters of *Phlomis bovei* de Noé using thermogravimetric analysis

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Abstract

This paper reports the pyrolysis study of *Phlomis bovei* biomass by thermogravimetric experiments in order to determine the thermal degradation behavior and kinetic parameters. The weight losses were found to occur in three stages. In the DTG thermograms, an increase of the heating rate tended to delay thermal degradation processes towards higher temperatures. The average values of activation energy and pre-exponential factor calculated from Ozawa-Flynn-Wall, Kissinger-Akahira-Sunose and Kissinger methods are 134.83, 134.06, 223.31 kJ/mol and 4.1610^{13} , 1.1810^{10} , 2.8110^{11} /s respectively. The three-pseudo-component method shows that the activation energy increases with increasing the heating rate for hemicellulose and cellulose while the activation energy of the lignin decreased with an increase of the heating rate. Predicted results and experimental data exhibit similar tendencies and the three pseudo-components model with n different from unity 1 is recommended as the most suitable for prediction of kinetic behavior of *Phlomis bovei* de Noé.

Keywords: Biomass, *Phlomis bovei* de Noé, pyrolysis, Kinetic parameters, Thermogravimetric analysis

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