

Supplementary Information

Investigation on Prospective Energy Power from Corncob Husk Biomass and its Biochars by Kinetic Parameters and Isoconversional Models

*Carolina C. Bueno, Amanda A. D. Maia, Leandro C. de Moraes and André H. Rosa**

*Departamento de Engenharia Ambiental, Instituto de Ciência e Tecnologia,
Universidade Estadual Paulista “Júlio de Mesquita Filho” (UNESP),
Av. Três de Março, 511, 18087-180 Sorocaba-SP, Brazil*

Ignition and burnout temperatures calculation

The ignition temperatures (IT) of the biomass were determined from TG by two different methods: intersection method (IM) and the deviation method (DM), for the three different heating rates 5, 7.5 and 10 °C in order to investigate the effect caused by different heating rate values in the IT and burnout temperatures (BOT) in both biomass. In IM, two points on a TG curve are first recognized as A and B. Point A is the point at which a vertical line from the first DTG peak (highest value) crosses the TG curve. Point B is the point at which devolatilization begins. A tangent at A on the TG curve and the horizontal line through B are calculated and the corresponding temperature at the intersection of the two lines is recognized as IT (Figure S1), as described by Lu and Chen (2015).¹ For the second method, DM, the ignition temperature is recognized at the position where the relative difference between the values of the two DTG curves (at nitrogen and air atmospheres) reaches 3%. In other words, the IT is defined at the location where the DTG curves at different atmospheres deviate.¹

Likewise, the burnout temperatures (BOT) of the biomass were determined from the single peak of DTG curve, more specifically, the second peak. The position on a TG curve at which a vertical line from the second peak of the DTG curve crosses the TG curve is denominated Point C. When the TG curve turns steady, Point D is found. In this context, the BOT is found by the intersection of the tangent on the TG curve at Point C and the horizontal line through D,¹ as indicated in Figure S1.

*e-mail: ahrosa@sorocaba.unesp.br

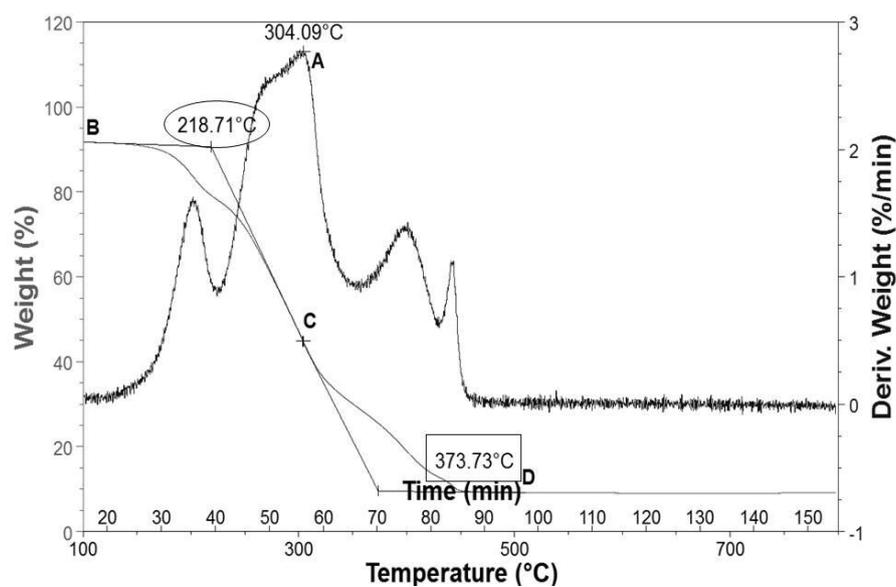


Figure S1. The ignition and burnout temperatures of biomass can be determined from thermogravimetric analysis by analyzing the TG and DTG curves according to the intersection method (IM) and the deviation method (DM). Schematics of determining IT (circle) and BOT (rectangle) for CH biomass at a heating rate of $5\text{ }^{\circ}\text{C min}^{-1}$ for air atmosphere, for instance.

Reference

1. Lu, J.-J.; Chen, W.-H.; *Appl. Energy* **2015**, *160*, 49.