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Predictions of biochar production and torrefaction performance from sugarcane bagasse using interpolation and regression analysis

Wei-Hsin Chen [1,*], Hung-Jen Hsu [2], Gopalakrishnan Kumar [3], Wojciech M. Budzianowski [4], Hwai Chyuan Ong [5]

1. Department of Aeronautics and Astronautics, National Cheng Kung University, Tainan 701, Taiwan
2. International Bachelor Degree Program on Energy, National Cheng Kung University, Tainan 701, Taiwan
3. Department of Environmental Engineering, Daegu University, South Korea
4. Wrocław University of Technology, 50-370 Wrocław, Poland
5. Department of Mechanical Engineering, Faculty of Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia

* Corresponding author
E-mail: weihsinchen@gmail.com; chenwh@mail.ncku.edu.tw

Abstract

This study focuses on the biochar formation and torrefaction performance of sugarcane bagasse, and they are predicted using the bilinear interpolation (BLI), inverse distance weighting (IDW) interpolation, and regression analysis. It is found that the biomass torrefied at 275 °C for 60 min or at 300 °C for 30 min or longer is appropriate to produce biochar as alternative fuel to coal with low carbon footprint, but the energy yield from the torrefaction at 300 °C is too low. From the biochar yield, enhancement factor of HHV, and energy yield, the results suggest that the three methods are all feasible for predicting the performance, especially for the enhancement factor. The power parameter of unity in the IDW method provides the best predictions and the error is below 5 %. The second order in regression analysis gives a more reasonable approach than the first order, and is recommended for the predictions.

Keywords: Torrefaction and biochar; Sugarcane bagasse; Bilinear interpolation; Inverse distance weighting (IDW); Regression analysis.

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