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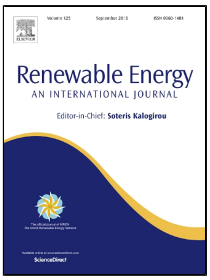

Ultrasonic Pelleting of Torrefied Lignocellulosic Biomass for Bioenergy Production

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Abstract

Torrefaction has been explored to increase the heating value and hydrophobicity of biomass. Pellets made from torrefied biomass can be used as a high-quality feedstock in gasification and as a substitute for coal in power plants. One existing challenge is that pelleting torrefied biomass is more difficult under the same operating conditions as used for pelleting untreated biomass. To address this challenge, this study employed ultrasonic vibration as an assistance to densify torrefied wheat straw biomass into pellets. Biomass with different severities of torrefaction was produced. Pellet properties and pelleting energy consumption were investigated. It was found torrefied wheat straw biomass could be densified into pellets of good quality with the assistance of ultrasonic vibration; whereas, with the same pelleting pressure but without ultrasonic vibration, good pellets could barely be made. It was also observed that the densities of torrefied biomass pellets were lower than the untreated biomass pellets. However, pellets made from biomass torrefied at a higher temperature had a higher durability. It was also found the energy density and heating value were

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