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Xiaopeng Bai, Guanghui Wang, Chunxiao Gong, Yong Yu, Weinan Liu,  
Decheng Wang

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## Co-pelletizing characteristics of torrefied wheat straw with peanut shell

Xiaopeng Bai, Guanghui Wang\*, Chunxiao Gong, Yong Yu, Weinan Liu, Decheng Wang

*Department of Agricultural Engineering, College of Engineering, China Agricultural*

*University, Beijing 100083, China*

### Abstract

The co-pelletizing characteristics of torrefied wheat straw and peanut shell with adding water were investigated. The physicochemical and friction characteristics of biochar were determined to investigate the mechanism of biochar inter-particle cohesive bonding. Results showed that optimized process conditions were obtained with 15% peanut shell and 10% water content. The volume density, maximum breaking force of pellets initially decreased and then increased, while energy consumption increased with increasing temperature. The main factors contributing to the cohesion of mixing pellet were the peanut shell content, water content and friction characteristics of biochar. The moisture absorption of the pellet was improved significantly, while the water absorption of pellets did not always decrease with increased temperature. Peanut shell is an effective and inexpensive binder in the preparation of good-quality biochar pellets. Biochar pellets derived from torrefaction temperature of 275–300 °C showed superior qualities for application as renewable biofuels.

**Keywords:** Torrefaction, Peanut shell binder, Friction characteristics, Co-pelletization, Bonding mechanism.

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