



## **Effect of biochar compound fertilizers on crop yield and fertilizer N use efficiency**

Lianqing Li (1,2), Xiangfeng Fu (1,2), Qiu Xie (1,2), Liangzhu Qiu (1,2), Zexian Lu (1,2), Genxing Pan (1,2)

(1) Center of Biomass and Biochar Green Technology, Nanjing Agricultural University, Nanjing 210095, China, (2) Institute of Resource, Ecosystem and Environment of Agriculture, Nanjing Agricultural University, Nanjing 210095, China

In order to meet the increasing demand for food in China, chemical fertilizers (NPK fertilizers) application continue to rise in agricultural production. Overuse of nitrogen fertilizer has occurred widely, and causes great challenges in environmental sustainability. To meet the need for reducing chemical fertilizer use and enhancing fertilizer N use efficiency, biochar compound fertilizers (BCF) are currently produced. Biochar are produced from crop straw with a maximum temperature of 500-600°C. Biochar compound fertilizer produced by rotary granulator. The nutrients proportion are 15:15:10 ( N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O). Field experiments were conducted in 8 sites across the major crop production areas from Heilongjiang in north east to Hubei in central China, from Yili, Xinjiang in the west to Suqian, Jiangsu in the east. The results showed that rice and maize yield increased by 6-10% and 5-12%, respectively, compared with chemical fertilizer. N use efficiency increased by 9.4-45.46% for rice, and 12.39-52.93% for maize. The rate of fertilizer application decreased by 8-12%, and a cost saving by 8-10% compared with chemical fertilizer. Protein content of grain increased by 3-10%. It indicates that biochar had the potential to form a more effective fertilizer that improved crop yield and the quality.