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Transformation Mechanism of Nutrient Elements in the Process of Biochar Preparation for Returning Biochar to Soil[#]

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Abstract: Returning biochar to soil is a heavily researched topic because biochar functions well for soil improvement. There is a significant loss of nutrients, which occurs during biochar preparation before biochar is returned to soil, thereby seriously undermining biochar's efficacy. Therefore, the transformation mechanisms of biochar pH, mass, nutrients and metals during pyrolysis under different atmospheres and temperatures were studied such that the best method for biochar preparation could be developed. Several conclusions can be reached: (1) a CO_2 atmosphere is better than a N_2 atmosphere for biochar preparation, although preparation in a CO_2 atmosphere is not a common practice for biochar producers; (2) 350 ^{o}C is the best temperature for biochar preparation because the amount of nutrient loss is notably low based on the premise of straw transferred into biochar; and (3) transforming mechanisms of pH, N, P and K are also involved in the biochar preparation process.

Keywords: agricultural waste; rice straw; biochar; nutrient transformation; pH

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