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Effects of pyrolysis conditions on physical properties of chicken manure derived biochar

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Abstract

© SGEM2018. All Rights Reserved. Biochar is a product of pyrolysis of biomass such as plant residues, organic wastes or etc. Being highly porous material that slowly releases nutrients, biochar is considered as an effective alternative fertilizer. It is reported that biochar properties are depending on the pyrolysis regime (e.g. pyrolysis peak temperature and duration), however information about quantitative dependences remains poor, especially for biochars made of specific substrates such as chicken manure. In this study, properties of biochars made of two types of chicken manure by different pyrolysis regimes were inverstigated. Three peak temperatures (400, 500 and 600□C) as well as four durations of pyrolysis by that temperatures (1, 2, 3 and 4 h) were used, which summarized in 12 different regimes for each of the manures inverstigated. By means of Brunauer–Emmett–Teller methods (BET) it was demostrated that biochars' surface area ranged between 1 and 12 m2 g-1. It positively correlates with both peak temperature and duration of pyrolysis, while the last one plays a more important role. Using scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX), we revealed four types of particles in all the biochars, independent on the pyrosysis regime and had a different origin, porosity, porous structure and C, N, P, K-contents.

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