Emerging applications of biochar: A way forward to improve the pig manure composting and attenuate toxic metals mobility in mature compost

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Abstract

The effect of integrated bacterial culture and biochar for giving impetus to heavy metals (HMs) stabilization and bacterial community activities during pig manure composting were evaluated in this study. High-throughput sequencing technology were carried out on six treatments as T1-T6, where T2 was single use bacteria culture (C), T3 and T5 were supplemented with 12% of two different kinds of biochar, wood- (WB) and wheat-straw biochar (WSB), T4 and T6 were together applied of bacterial consortium mixed with biochar (12%WB and 12%WSB), respectively. T1 was carried out as control for the comparison. The results show that the population of bacterial phyla were significantly greater in T6 and T4. The predominate phylum were *Proteobacteria* (56.22%), *Bacteroidetes* (35.40%) and *Firmicutes* (8.38%), the dominant genera were *Marinimicrobium* (53.14%), *Moheibacter* (35.22%) and *Erysipelothrix* (5.02%). Overall, integrated bacterial culture and biochar could efficiently promote the immobilization of HMs (Cu and Zn), as well as enhancing abundance and form unique selectivity of bacterial community to promote degradation and improving the hygiene efficiency of compost quality.

Keywords: Biochar, bacterial culture, toxic metals, bacteria community, pig manure.