

Study on the odor removal of livestock manure compost by pangolagrass biochar or poultry litter biochar ⁽¹⁾

Shu-Min Wang ^{(2) (5)} Hsin-Hung Liu ⁽²⁾ Tsui-Huang Yu ⁽²⁾ Cheng-Hsun Chung ⁽³⁾ and Hsiu-Lan Lee ⁽⁴⁾

Received: May 13, 2021; Accepted: Aug. 13, 2021

Abstract

This report has collected several experiments conducted in recent years to evaluate the effect of pangolagrass biochar (PB) or poultry litter biochar (PLB) on the odor removal of livestock manure compost. The first experiment was to investigate the effect of covering PB on the release of ammonia from broiler manure. Results showed that the released amount of ammonia decreased with the increased proportion of PB added. The ammonia removal rate in 1 hour was between 10.3 - 46.2%, and the ammonia removal rate in 24 hours was between 5.9 - 40.2%. The second experiment aimed to evaluate the ammonia removal rate of the prototype deodorants which combined PB/PB powder with ammonia oxidizing bacteria (AOB, strains selected by the Livestock Research Institute). The addition was adjusted based on the same dry matter base, the ammonia removal rate of the deodorant treatments, PB+AOB and PB powder+AOB, were 52.4% and 36%, respectively, which performed better than the 23.6% and 20.2% of PB and PB powder. The third experiment aimed to evaluate the effect of PB on ammonia removal from broiler litter compost. The results showed that the total amounts of ammonia and trimethylamine released in the control (without addition) during the entire compost period were higher than those of PB and PLB treatments, indicating that the biochar treatments could reduce the odor emission during the composting process. The effect of odor removal increased with increased addition of biochar. The odor removals of PB treatments were slightly better than those of PLB treatments. The forth experiment aimed to evaluate the effect of PB on the odor removal of solid-liquid separated pig manure compost. Results showed that the total removal rate of ammonia and hydrogen sulfide of PB treatment reached 65% and 72%, respectively. All results in this study showed that adding PB and PLB had a positive effect on the odor removal, which could be used as a reference for livestock farm applications.

Key words: Pangolagrass biochar, Poultry litter biochar, Livestock manure compost, Odor removal.

(1) Contribution No. 2675 from Livestock Research Institute, Council of Agriculture, Executive Yuan.

(2) Hengchun Branch, COA-LRI, Pingtung 94644, Taiwan, R. O. C.

(3) Livestock Management Division, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(4) Animal Industry Division, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(5) Corresponding author, E-mail: smwang@mail.tlri.gov.tw.