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Gas Emissions from Poultry Manure Compost Amended with Biochar

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ABSTRACT Poultry litter is comprised of excrement, wood shavings, animal feed, and feathers that are taken from poultry barns. This substance is useful as a soil amendment as it is high in nutrients such as N, P, and K. It also often contains pathogens, plant seeds, and various organic pollutants. Composting of poultry litter yields a chemically stable product that is relatively free of such undesirable constituents. However, the composting process is known to emit significant quantities of N-rich malodourous gases, which are potentially harmful to the environment and animals (including humans) that live and work around the composting facilities.

The application of biochar to compost increases the compost's physical and chemical absorption capacity. In this way, biochar amended compost may effectively volatilize less nutrients, thus increasing its value as a fertilizer while diminishing negative environmental and physio-hygienic effects. Further, the application of biochar-amended compost to agricultural fields has potential long-term carbon-storage benefits.

The current research will investigate the effects of various proportions of biochar (ie. %15, %25, %35 v/v) on physical parameters and gas emissions of poultry litter compost. Sixteen passively-aerated, pilot-scale compost reactors will be used for the investigation. A multi-stream FTIR gas analyzer will be utilized to determine the concentrations of various gasses in the compost's exhaust stream. Several compost physical parameters will also be monitored. A detailed experimental design and results will be presented.

Keywords: Compost; biochar; gas emissions; manure; FTIR