Anaerobic Degradation of Tetracyclines in Agricultural Manure

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Tetracycline antibiotics are widely used in agriculture to prevent infections in livestock and to promote animal growth. Large amounts of antibiotics are released into the environment through animal waste, which can subsequently lead to the spread of antibiotic resistant bacteria. Anaerobic digestion is one of the methods used to reduce the concentrations of antibiotics and antibiotic resistant bacteria.

In this study, tetracycline antibiotics (tetracycline, oxytetracycline, and chlortetracycline) are spiked onto cattle, swine, and poultry manure and the concentrations of the tetracyclines and their main metabolites are monitored over a 64 day period. Air-tight PVC tubes are used during the anaerobic digestion process, and samples are taken every 8 days. The tetracyclines in the manure are extracted using a mixture of methanol and a sodium-EDTA buffer. The tetracyclines were trapped on polymeric weak cation cartridges and analyzed using Liquid Chromatography-Mass Spectrometry (LC-MS). The anaerobic degradation rates of the tetracyclines used in this study will be presented.