

TITLE: EFFECT OF POULTRY LITTER COMPOSTING ON PERSISTENCE OF ANTIMICROBIAL RESISTANCE GENES

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ABSTRACT:

Brazil stands out in the ranking of broiler chicken production, holding the positions of the world's largest exporter and the second largest producer. The major problem facing the poultry industry is the large-scale accumulation of poultry litter. A viable strategy is the reusing of this material in agriculture since the poultry litter has the potential to increase organic matter in the soil and provides a nutritional contribution to the plants. However, due to the large proportion of drugs administered to animals with prophylactic indication, therapeutics, as well as zotechnical additives, the poultry litter can be source of antimicrobial residues, antimicrobial resistant bacteria and antimicrobial resistance genes and can contribute to the dissemination and contamination of the soil. The composting method can reduce the contaminants in the residues and this practice consists of an aerobic process, where several groups of microorganisms decompose organic materials from animal and plant origin, generating stable inorganic and organic products, being responsible for the elimination of pathogenic microorganisms. Therefore, the objective of this work was to evaluate the effect of poultry litter composting on antimicrobial resistance genes for a period of 120 days. The samples were collected at 0, 30, 60, 90 and 120 days of composting, totaling five samples. Total DNA extraction was performed followed by amplification of the 16S rDNA and genes encoding ampicillin (*ampC*) and sulfonamide (*su1* and *su2*) resistance by PCR (Polymerase Chain Reaction). The *ampC* gene was detected only at time zero. The *su1* and *su2* genes were detected up to 120 days. Composting was efficient to eliminate the gene that confers resistance to beta-lactam type *ampC* after approximately 30 days. For sulfonamide resistance, even after 120 days of composting, the gene remained present. This information is crucial to reiterate the need to implement standards for residues management and to establish quality parameters for their reuse in agriculture since composting has varied effects on different contaminants and it is dependent on the conditions and materials used in the process.

Keywords: *ampC*, beta-lactam, manure residue, *su1*, *su2*

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