TITLE: INVESTIGATION OF ANTIMICROBIAL RESISTANCE GENES IN ANIMAL-ORIGIN FERTILIZER

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ABSTRACT:

The use of excreta and residues originated from animals is very common in agriculture due to its characteristic of being excellent source of nutrients. When it is properly managed, they can suppress partially or totally the use of chemical fertilizer. In management of these animals, antimicrobials are administered prophylactically, therapeutically and as a zootechnical additive, as a consequence, organic fertilizer from animal residue may be a reservoir of antimicrobials, antimicrobial resistant bacteria and antimicrobial resistance genes. Therefore, the objective of this work was to evaluate the presence of genes encoding antimicrobial resistance in different types of fertilizers originated from animals and used in agricultural production. Six samples of animal residues were collected: bovine manure from organic and conventional production system, fresh and composted organic poultry litter, composted conventional poultry litter, and bone flour. The total DNA was extracted and 16S rDNA gene amplification was performed followed by the detection of sulfonamide resistance genes (*sul*1 and *sul*2), beta-lactam (bla_{CTX-M}), colistin (*mcr*-1) and quinolone (*qnr*A).The sulfonamide resistance gene was detected in all samples. The bla_{CTX-M}, *mcr*-1 and *qnr*A genes were not detected. Once these fertilizers will be incorporated into soils, they can carry resistance genes and change the environmental resistome, which it can lead to increased dissemination of resistance to commensal bacteria and animal and human pathogens. The occurrence of *sul*1 and *sul*2 genes in residues from animal production conventional and organic systems, fresh and composted, reinforces the necessity of monitoring of antimicrobial resistance determinants in these residues that will be used for agricultural production. It will support management strategies able to reduce the risk of dissemination of antimicrobial resistance in the environment.

Keywords: animal residues, organic fertilizers, polymerase chain reaction, sulfonamides.

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