

Title: Macrolide, lincosamide, and streptogramin B (MLS_B) resistance in soils amended with swine manure – **NPB #05-068**

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Abstract:

The land application of treated swine manure has been proposed as a possible factor in the environmental development and dissemination of antimicrobial resistance, but this possibility has not been clearly demonstrated. This work included specific experiments addressing (i) levels of MLS_B antimicrobials and resistance in fields regularly amended with manure from conventional and organic swine farms as compared to fields not amended with manure, (ii) the level of resistance in specific populations of microorganisms, and (iii) the contributions of the antimicrobials lincomycin and tetracycline versus MLS_B resistant microorganisms to MLS_B resistance in soil batch tests. MLS_B antimicrobials were quantified in manure and soil samples by solid phase extraction and liquid chromatography tandem mass spectrometry (LC-MS). MLS_B resistance was quantified in the same samples using fluorescence *in situ* hybridization (FISH) to detect the ribosomal modification responsible for MLS_B resistance. The combination of this method with phylogenetic identification protocols allows the quantification of resistance in particular organisms or groups of organisms. MLS_B antimicrobials were generally not detected in the soil samples, while tetracyclines were more persistent. No significant difference in MLS_B resistance was observed between amended and unamended soils, either in the soil samples or in laboratory batch tests. The results suggest that land application is not contributing to the development and spread of MLS_B resistance. However, given the persistence of tetracycline antimicrobials observed in this and previous work, it would be prudent to also examine the levels of tetracycline resistance in these samples.

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