



USDA-CSREES 2007 National Water Quality Conference

Environmental Water Quality Impacts of Antibiotic Resistant Bacteria of Human Health Concern

Farming and animal agriculture is a large part of the economy and culture of Eastern North Carolina. With increasing societal awareness of widespread use of antibiotics and potential public health risks from resulting bacterial resistance, the industry's use of antibiotics at sub-therapeutic levels for preventative care and growth promotion has become an issue of concern and debate. There has been some research into the potential health effects of antibiotic resistance (AR) in food animals, but there is little or no data regarding ambient water quality impacts, or of health effects resulting from human exposure to AR bacteria and pathogens originating from these farms. This study compares potential risks of those who work on or live near swine farms, to those associated with non-animal production agriculture. Ground and surface waters surrounding swine CAFOs and row crop farms in eastern North Carolina were analyzed for *E. coli*, *Enterococci* sp. and *Salmonella* sp. Additionally, swine waste samples were taken from barns and lagoons in an effort to determine if the CAFOs are a potential source of the bacteria found in ambient waters. The bacteria were quantified, biochemically confirmed, and phenotypically characterized for AR traits. Detectable levels of target bacteria were found, with concentrations varying by species, sample and season of collection. *Salmonella* concentrations ranged from <0.03 (lower detection limit) to 96 cfu/ml in surface waters, and were up to 1.1×10^4 cfu/ml (4 log₁₀) in lagoons. Log₁₀ cfu levels *E. coli* were up to 3.8/100ml in surface water and 8.2/100ml in waste water. These data will be statistically analyzed to identify significant differences in types and/or quantities of bacteria found in farm waters and/or differences in AR properties of these bacteria. Initial analyses have found single and multiple AR in isolates analyzed to date.

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