

Variable retention of antibiotic activity after exposure to high organic soil

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One possible driver for the evolution, persistence and dissemination of resistant bacteria is commercial animal production where antibiotic selection occurs *in vivo*, but also possibly at the animal-soil interface. The latter niche is exposed to both excreted drugs and fecal flora leading to a potentially important selection compartment. To begin assessing the biological relevance of this compartment, we established an *in vitro* assay to measure biological activity of antibiotics after exposure to soil slurry. We focused our efforts on high organic content Palouse loam. Soil was mixed in equal volume with water (g/v) and supplemented with antibiotics. After a given incubation period at room temperature, supernatant was retrieved, filter sterilized and antibiotic activity was assessed using a sensitive strain of *Escherichia coli*. Tetracycline was completely inactive after 24 hr exposure to soil even when high doses were used (200 µg/ml). Ampicillin and cephalothin retained biological activity over 24 hr, but some activity was lost if the soil was not autoclaved prior to testing or after 72 hr exposure. These findings indicate that soil could serve as a selection compartment for evolution, persistence, and dissemination of antibiotic resistant bacteria, but not all drugs will produce selection pressure and the soil microflora and soil chemistry will likely affect retention of biological activity in this compartment. Additional studies are underway to evaluate other drugs, exposure times, and soil chemistry interactions.