

Public Abstract

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Title: EFFECTS OF VETERINARY ANTIBIOTICS ON ATRAZINE DEGRADATION IN SOIL

The release of veterinary antibiotics (VAs) in the environment is concerning because VAs have been linked to the development of antimicrobial resistant bacteria and may influence nutrient cycling and agrochemical degradation. Manure containing VAs is often applied to agricultural land treated with herbicides; therefore, it is possible that the VAs may suppress the activity of microorganisms associated with herbicide degradation.

Degradation of the herbicide atrazine (ATZ) in soil is important because ATZ is linked to deleterious water quality issues. The objectives of this study were to investigate the influence of two VAs, sulfamethazine and oxytetracycline, on ATZ degradation and activities of the microbial enzymes dehydrogenase (DH) and B-glucosidase (B-glu) in soil and soil amended with 5% swine manure. Soil and manure-amended soil incubation experiments were used to study ATZ degradation and microbial enzyme activity. Addition of the VAs to soil only resulted in no significant change in the quantity of ATZ remaining in soil after incubation. However, the addition of manure decreased ATZ degradation by nearly 20% and increased the half-life of ATZ by approximately 20 days. B-glucosidase exhibited a significant VA treatment effect, but DH activity indicated that microbial activity was unaffected, overall, by VA treatment. The application of VAs to agricultural fields is not likely to reduce ATZ degradation in soil at the VA concentrations investigated; however, the input of manure could increase the persistence of ATZ in the soil environment.