

Plants Uptake Antibiotics

Routine feeding of antibiotics to livestock may be contaminating the environment
Soil Science Society of America.

Madison, Wisconsin (July 9, 2007)--Scientists at the University of Minnesota have been evaluating the impact of antibiotic feeding in livestock production on the environment. This particular study, funded by the United States Department of Agriculture (USDA), evaluated whether food crops accumulate antibiotics from soils spread with manure that contains antibiotics. Results from the study are published in the July-August 2007 issue of the *Journal of Environmental Quality*. The research was also presented in Indianapolis, IN at the Annual Soil Science Society of America Meeting in November 2006.

Plant uptake was evaluated in a greenhouse study involving three food crops: corn, lettuce, and potato. Plants were grown on soil modified with liquid hog manure containing Sulfamethazine, a commonly used veterinary antibiotic. This antibiotic was taken up by all three crops. Concentrations of antibiotics were found in the plant leaves. Concentrations in plant tissue also increased as the amount of antibiotics present in the manure increased. It also diffused into potato tubers, which suggests that root crops, such as potatoes, carrots, and radishes, that directly come in contact with soil may be particularly vulnerable to antibiotic contamination.

The ability of plants to absorb antibiotics raises the potential for contamination of human food supply. However, Satish Gupta, group leader notes "The adverse impacts of consuming plants that contain small quantities of antibiotics are largely unknown". Consumption of antibiotics in plants may cause allergic reactions in sensitive populations, such as young children. There is also concern that consuming antibiotics may lead to the development of antimicrobial resistance, which can render antibiotics ineffective.

Holly Dolliver, the lead scientist in this study, notes that antibiotics consumed by plants may be of particular concern to the organic farming industry. Manure is often the main source of crop nutrients for organic food production, since regulations prohibit the use of synthetic fertilizers. According to the USDA, producers must manage animal materials in a manner that does not contribute to contamination of crops by residues of prohibited substances, which includes antibiotics. However, manures containing antibiotics are not formally banned or prohibited.

Further research is needed to investigate the presence of antibiotics in edible parts of plants, especially vegetables that are consumed raw, and how different plants absorb different antibiotic compounds. Research is ongoing at the University of Minnesota to further investigate the potential fate and transport of antibiotics introduced to the environment from livestock operations.