

## Livestock Antibiotics Can End Up in Human Foods

**ST. PAUL, Minnesota**, July 12, 2007 (ENS) - Foods such as **corn, lettuce and potatoes** have been found to accumulate antibiotics from soils spread with animal manure that contains these drugs. The study results indicate that organic foods are most likely to contain these drugs because manure is often the main source of crop nutrients for organic food production.

Funded by the U.S. Department of Agriculture, USDA, scientists at the University of Minnesota evaluated the impact of antibiotic feeding in livestock production on the environment. Study results are published in the July-August 2007 issue of the "Journal of Environmental Quality."

Plant uptake was evaluated in a greenhouse study involving three food crops - corn, lettuce, and potatoes. The plants were grown on soil modified with liquid hog manure containing Sulfamethazine, a commonly used veterinary drug.

Sulfamethazine has been used to treat bacterial diseases in human and veterinary medicine and to promote growth in cattle, sheep, pigs and poultry.

In the University of Minnesota study, this antibiotic was taken up by all three crops, with the highest plant tissue concentrations found in corn and lettuce, followed by potato.

Concentrations in plant tissue also increased as the amount of antibiotics present in the manure increased.



**Test plants absorbed antibiotics from manured soil.**  
(Photo courtesy University of Minnesota)

Concentrations of antibiotics were found in the plant leaves, and the drugs 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.**

Holly Swanson 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," she says.

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, manure containing antibiotics are not formally banned or prohibited.

**The ability of plants to absorb antibiotics raises the potential for contamination of human food supply,** but group leader Satish Gupta says, "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.

Sulfamethazine is one of a class of drugs called sulfonamides used in combination to treat a variety of infections in humans. At one time, sulfonamides were widely used in the treatment and prevention of infections such as urinary tract infections, chlamydia, rheumatic fever, toxoplasmosis and malaria. **The development of resistance in many of these organisms has limited the clinical usefulness of these drugs,** according to the Access Project, a national program of the AIDS Treatment Data Network.



**Manure spreader fertilizes a field of alfalfa.** (Photo by Joann Lamb courtesy USDA)

"There is sufficient evidence in experimental animals for the carcinogenicity of sulfamethazine," according to the International Agency for Research on Cancer, but this agency says there is "inadequate evidence in humans for the carcinogenicity of sulfamethazine."

In a 1997 continuous breeding study in mice conducted by federal government researchers with the National Institute of Environmental Health Sciences, sulfamethazine reduced fertility in both males and females.

A 2002 study by the U.S. Geological Survey of concentrations of antibiotics found in Midwestern streams during runoff events detected the drugs in only 1 percent of water samples. Of the 37 antibiotics tested, only sulfamethoxazole was detected in two samples.

On the issue of resistance to antibiotics that may develop as a result of using antibiotic-laden manure, a study published in March in the journal "Environmental Microbiology" suggests that "**manuring of arable soils may stimulate the spread of resistance genes by introduction of resistant populations and antibiotics.**"

Dolliver and Gupta say 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.