

[Research](#)
[Technical Assistance](#)
[Publications](#)
[Events](#)
[About](#)

Fate and Transport of Steroid Hormones and Veterinary Antibiotics Derived from Cattle Farms

Concentrated animal feeding operations (CAFOs) have been identified as one of the most important sources for the release of animal hormones and veterinary antibiotics into the aquatic environment. Funded by a [USDA \(United States Department of Agriculture\)](#) research grant, Dr. Wei Zheng set out to identify and quantify the environmental fate and transport of several commonly-occurring steroid hormones, veterinary antibiotics, and their metabolites.

The researchers examined levels of 17 α -estradiol, 17 β -estradiol and estrone in water, manure-contaminated wastewater and soil. They also conducted laboratory experiments to investigate aerobic and anaerobic degradation of six steroid hormones and two antibiotics. The results indicated that anaerobic conditions prevented or slowed the breakdown of hormone contaminants.

Therefore, Dr. Zheng and his team concluded that increasing the residence time of wastewater in CAFO lagoons or using aerobic tanks may be economical and efficient methods to degrade hormone and antibiotic contaminants and thus reduce their loads to the environment.

Batch soil experiments in the laboratory found that the antibiotic ceftiofur showed a relatively higher sorption capacity than florfenicol in soils amended with animal manure. The sorption capacities of florfenicol in manure-amended soils were less than those in non-amended soils, indicating manure-borne colloids can facilitate leaching of this contaminant to groundwater through soil.

Field monitoring of bodies of water surrounding agricultural fields receiving CAFO waste found that hormone contaminants were seldom detected in well water samples, but they were observed in some subsurface tile-drained water samples, especially during effluent irrigation and storm events.



Energy

Pollutants

Aquatic Plastic Debris

Metals

Metalworking Fluids

Per- and Polyfluoroalkyl Substances (PFASs)

Agricultural Chemicals

PPCPs in the Environment

Pilot Study on PPCPs at Champaign and Urbana Wastewater Treatment Plants (WWTPs)

PPCPs: Extending Knowledge and Mitigation Strategies

Fate and Transport of Steroid Hormones and Veterinary Antibiotics Derived from Cattle Farms

Uptake, Translocation, and Accumulation of Pharmaceutical and Hormone Contaminants in Vegetables

Fate of Pharmaceutical and Personal Care Products in Irrigated Wastewater Effluent

Karst Groundwater Contaminants in Western Illinois

PPCPs in Karst Groundwater in Southwestern Illinois

Triclosan in Illinois Rivers and Streams

Tunable Luminescent Carbon Nanospheres with Well-Defined Nanoscale Chemistry for Synchronized Imaging and Therapy

Occurrence and Removal of Pharmaceutical and Hormone Contaminants in Rural Wastewater Treatment Lagoons

Degradation Kinetics and Mechanism of Antibiotic Ceftiofur in Recycled Water Derived from a Beef Farm

Anaerobic Transformation Kinetics and Mechanism of Steroid Estrogenic Hormones in Dairy Lagoon Water

Nano-CarboScavengers

Medicine Collection Boxes

2008 PPCPs Symposium

2016 PPCPs in the Environment Conference

2017 Emerging Contaminants in the Aquatic Environment Conference

2018 Emerging Contaminants in the Aquatic Environment Conference

2019 Emerging Contaminants in the Environment Conference

2016 Teacher Workshop on Pharmaceutical and Personal Care Products in the Environment

PPCPs Videos

Emerging Contaminants Consortium

PCBs & PBDEs

Polycyclic Aromatic Hydrocarbons (PAHs)

Waste Utilization

Water

Instruments & Equipment

Hazardous Waste Research Fund

Meet the Scientists

- Wei Zheng

Publications

- Degradation Kinetics and Mechanism of Antibiotic Cefotiofur in Recycled Water Derived from a Beef Farm
- Anaerobic Transformation Kinetics and Mechanism of Steroid Estrogenic Hormones in Dairy Lagoon Water
- Occurrence and removal of pharmaceutical and hormone contaminants in rural wastewater treatment lagoons
- Fate of estrogen conjugate 17 α -estradiol-3-sulfate in dairy wastewater: Comparison of aerobic and anaerobic degradation and metabolite formation
- Modeling Manure Colloid-Facilitated Transport of the Weakly Hydrophobic Antibiotic Florfenicol in Saturated Soil Columns



One Hazelwood Drive, MC-676
Champaign, IL 61820
p: 217-333-8940
[Email us](#)

Home of Illinois' State Scientific Surveys
Illinois Natural History Survey
Illinois State Archaeological Survey