Sorption and Transport of Hormonally Active Agents in Soils. (A05-lee071608-Oral)

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Abstract:

Natural and synthetic hormones as well as antibiotics from both human and animal wastes may be important to endocrine disruption; however, research on their environmental fate is lacking. We conducted laboratory soil column and batch equilibration studies to characterize the sorption, transformation, and transport of estrogens, testosterone, and selected swine pharmaceuticals. Soils that represent a wide range in pH, organic carbon content, clay content/type, and cation exchange capacity were used including several Midwestern U.S. soils and selected samples from a collection of soils and freshwater sediments used in past EPA investigations. Interpretation of likely sorption and transformation mechanisms, and the potential for leaching and retardation will be presented. Measured column breakthrough curves were used to evaluate transport parameters and transformations under steady, saturated water flow conditions. All pharmaceuticals assessed have high sorption coefficients, suggesting limited leaching potential in soils in the absence of facilitated transport. The latter mechanism may be significant in tile-drained fields under land application of manure and warrants further investigation.

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