Fate and Transport of Endocrine Disrupting Chemicals in Soil. (S01-casey161927-Oral)

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Abstract:

A series of laboratory batch sorption and miscible-displacement column experiments were done using radiolabeled 17b-estradiol (E). Also, a field lysimeter experiment was done using E. The applied concentrations were similar to levels of E found in manures. The batch experiments indicated high sorption with Freundlich distribution coefficients ranging from 0.004 L/g for sand and 6.670 L/g for a silt loam. Also, there were strong correlations between E and particle size and organic matter content. The column experiments indicated chemical nonequilibrium transport and the only estrogen present in the column effluent was probably estriol. The E and another estrogen, likely estrone, were only present in the sorbed phase inside the soil columns. Two models were used to describe the column experiments; one with transformations and the other without. Both models resulted in excellent descriptions of the data, which indicated nonunique solutions. However, both models indicated that most mineralization occurred on the sorbed phase and that sorption was fully kinetic. In the lysimeter experiment, E was transported through 2.3 m of soil and present at concentrations (30-525 ng/L) that were 30 to 500 times greater than levels that cause vitellogenin production in male fish.

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