Virus Transport through Soil Columns under Saturated and Unsaturated Flow Conditions. (S01-you110502-Oral)

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Abstract:

Viruses that are present in sewage sludges, wastewater, and septic tanks pose a great risk in water resources. The objectives of our research were (1) to examine the mechanisms responsible for viral removal (sorption and inactivation) in unsaturated systems and (2) to investigate the removal of viruses during saturated and unsaturated transport in porous materials having different properties. Column experiments were conducted using two model viruses (MS-2 and PhiX174). Results from experiments conducted with inert and reactive sands suggest that in the presence of reactive solid surfaces, increased reactions at the solid-water interface rather than at the air-water interface dominate virus removal under unsaturated conditions. The water-content effect on viral behavior in the complex soil systems was much more complicated and depends heavily on the properties of the porous materials used. Significant differences in virus removal were observed between saturated and unsaturated experiments in the two Delaware soils that contained high metal oxide contents but very little to no water-content effect was observed in the other three soils tested.

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