Effects of Steer Manure and Citric Acid Amendments on Depleted Uranium (DU) Movement Through Arid Zone Soils. (S09-parra113349-Poster)

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Abstract:

Depleted uranium (DU) is a by-product generated from the uranium enrichment process. DU remaining on the ground after munitions firing is converted to schoepite, which can then be disseminated throughout the environment depending on its mobility in soil, water, and air. Eight soil columns (7.7 cm diam by 30 cm high) were filled with calcareous soils to demonstrate schoepite's behavior under worst-case conditions in a DU-contaminated area of the southwestern U.S. Monsoon-type rainfall was simulated and leachates were collected and analyzed. Treatments included commercial steer manure (43 Mg/ha), citric acid (20 mM/kg soil), and schoepite particle size. Both manure and citric acid enhanced DU solubility and mobility through the columns. Leachate concentrations from citric acid amended columns were as high as 4,000 mg U/L whereas manure amended column leachate reached about 200 mg U/L. Leachates from columns containing different size particles had an order of magnitude higher U levels than those from columns containing discrete, 5-10 mm schoepite pebbles. Leachate pH decreased up to 2.5 units in response to citric acid addition but was not affected by steer manure. EC increased slightly after citric acid application but was not affected by steer manure.

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