CSREES National Water Quality Program

Title: Effective nitrate pollution control with electrokinetics

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Organization: University of Arizona

State: AZ **Region:** Southwest States and Pacific Islands **Year of Funding:** 2001

Theme: Pollution Assessment and Prevention

Situation: Nitrate contamination of surface and groundwater is an emerging problem in many agricultural areas throughout the world. Nitrate has high solubility in water and low retention in the soil profile. Best management practices can minimize losses from the plant root zone if not confounded by rainfall, but cannot return lost chemicals. Electrokinetics has the potential to attract and retain nitrates to the region near the anode.

Objectives: This study is evaluating the effectiveness of applying alternative levels of dc electrical current during different periods of time to distribution of nitrate and pH levels from anode to cathode in soil column tests with three soil types.

Methods: Initial tests were conducted with lettuce growth on beds with subsurface drip irrigation; anode and cathode wires were located adjacent to drip tube and between crop rows at drip tube depth. Current tests are measuring nitrate distribution in vertical soil columns after input of nitrate solute and dc electrical current between anode and cathode located at top and bottom of the columns.

Partnerships: None.

Research: The research is the dissertation research project for one Ph.D. student.

Resources: The research technician was jointly supported by another funded research project.

Results: Field plot tests of subsurface drip irrigated lettuce production yielded inconclusive results; lettuce yields and nitrate content were not significantly different, soil nitrate content was higher near the anode at some sampling times, but not all. Soil column tests with sand found nitrate concentration to be much higher near the anode at column top; pH near the anode was about 2, the pH near the cathode was about 11.5