

ENVIRONMENT & ENERGY / ENVIRONMENTAL REMEDIATION

PROJECT: Environmental Remediation
Technologies: *Modeling of the Migration and Distribution of Natural Organic Matter Injected Into Subsurface Systems*

CLIENT: U.S. Department of Energy
PRINCIPAL INVESTIGATOR: Dr. Leonel Lagos
LOCATION: Savannah River Site, Aiken, SC

Description:

This work aims to assemble, integrate and develop a practical and implementable approach to quantify and model potential natural organic matter (NOM, such as humic and fulvic acids, humate, etc.) deployment scenarios for the range of conditions at DOE sites.



Fig 1. Huma-K

The primary objective is to understand the sorption behavior of humic acid (HA) under varied pH levels so that the results from the injection tests previously conducted in the field can be correlated to the properties of the humic acids.

This work also includes modeling of the migration and distribution of humate injected into subsurface systems during deployment for in situ treatment of radionuclides, metals and organics. The data from batch and column experiments will be used to determine transport parameters which will be then used for modeling of the migration and distribution of HA injected in the subsurface to address complexities that are not currently addressed in the available models (i.e., spatial and temporal changes in pH and organic properties).

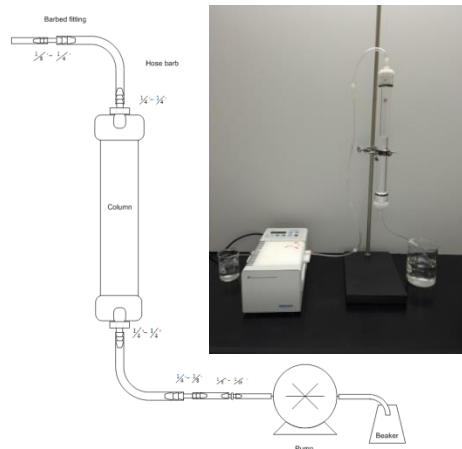


Fig 2. Experimental Column Set-up

Benefits:

- Understanding the sorption of humic acid onto SRS sediments with varying pH to correlate results with HA injection tests.
- Assessment of humic acid mobility injected into soil columns.
- Attainment of sorption/desorption parameters of humic acid onto SRS soil.
- Prediction of the migration and distribution of humate injected into subsurface systems during deployment for in situ treatment.

Accomplishments:

- Estimated parameters for column experiments (column size, flow rates, concentration of humic acid).
- Characterized SRS soil from FAW-1: 60' - 70' and obtained soil pH, bulk density, particle density and porosity.
- Modeled injection scenarios to predict sorption of humic acid onto the SRS sediment at various concentrations and flow rates.
- Designed experimental setup to be able to run humate injection experiments to estimate sorption and desorption of HA onto sediments.

ABOUT

Since 1995, the Applied Research Center (ARC) at Florida International University (FIU) has provided critical support to the Department of Energy's Office of Environmental Management (DOE-EM) mission of accelerated risk reduction and cleanup of the environmental legacy of the nation's nuclear weapons program. ARC's applied research is performed under the DOE-FIU Cooperative Agreement (under Contract # DE-EM0000598) and provides technical support to DOE EM in the area of environmental remediation and STEM workforce development and training.

Project Contact:

Dr. Leonel Lagos
Ph: (305) 348-1810
Email: lagosl@fiu.edu
10555 W. Flagler Street, EC 2100
Miami, FL 33174
arc.fiu.edu