Project ID: 2004SD19B

Title: Evaluating Glomalin and Its Role in the Sorption of Organic Contaminants

Project Type: Research

Focus Categories: Groundwater, Water Quality, Solute Transport

Keywords: Soil organic matter, Organic Contaminants, Glomalin

Start Date: 03/01/2004

End Date: 02/28/2005

Federal Funds Requested: $24,903

Non-Federal Matching Funds Requested: $49,864

Congressional District: SD First

Principal Investigators:
Frank V. Schindler, South Dakota State University
James A. Rice, South Dakota State University

Abstract

South Dakota relies heavily on ground water resources to fulfill its domestic needs. Petroleum compounds such as benzene, toluene, ethylbenzene, and xylene (BTEX) have been implicated as significant sources of ground water contamination in South Dakota. Soil organic matter (SOM) has the ability to remove (sorb) potentially hazardous organic chemicals that have been introduced, either deliberately or inadvertently, into the environment. Glomalin, a glycoprotein in SOM, is noted for its ameliorative effects on soil structure; however, its molecular character and sorptive capacity for organic contaminants are unknown. Through a series of sorption experiments, and solid-state nuclear magnetic resonance and various chemical analyses, insight into glomalin’s molecular and sorptive character will be realized. The objectives of this study are to 1) evaluate the role of glomalin and its fractions in the sorption of hydrophobic organic contaminants, and 2) elucidate a molecular understanding of glomalin through its extraction, fractionation, and characterization. Glomalin may prove to be a very useful index in predicting the fate of organic contaminants introduced into the environment.