REMEDIATION TECHNOLOGY

Remediation Technology for Chlorinated Pollutants Based on Natural Product from Soil Bacteria

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Brief:

Carbon tetrachloride is a carcinogenic pollutant that has contaminated groundwater beneath former grain storage and industrial sites. Researchers are addressing a nationwide pollution issue by developing molecules based on a bacterial product to clean up sites contaminated by carbon tetrachloride. The new technology allows pollution to be treated on-site rather than current methods of moving the hazard to the surface. Pyridine di-thiocarboxylic acid (PDTC) is a small molecule natural product that leads to complete dechloriation of carbon tetrachloride pollution. The goal is to synthesize PDTC derivatives for improved performance in field application and conduct analytical work to assess the performance of the new derivatives.

Objectives and Progress:

1. Identify verified, chemically pure PDTC sulfonate, polymer-linked PDTC and their copper complexes, with the goal of improving water solubility of the active molecule and enabling modification of other properties such as density.
2. Develop data regarding solubility and dechlorination rates for new derivatives of PDTC.
3. Assess toxicology of simulated remediation mixtures and refine dechlorination data to include other solvents.

Return on Investment:

- **Jobs**
  - Research scientists & technicians = 1.5
  - Undergrad & Graduate Assistants = 2
- **Output**
  - The team has established baseline data for carbon tetrachloride removal rates by the natural product (PDTC). This data can be used by engineers designing remediation technologies and will be used by us to evaluate synthetic derivatives.
  - Continued study of remediation techniques is enhanced by the inclusion on a statewide NSF (EPSCoR) proposal to study basic aspects of the underlying chemistry of carbon tetrachloride destruction.

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