

Arsenic Speciation in Arsenic-Rich Brazilian Soils from Gold Mining Sites under Anaerobic Incubation

Arsenic enters the environment naturally through rock weathering but its concentrations can be dramatically increased by human activity such as mining. ISTC's senior chemist, John Scott, and collaborators from the Federal University of Viçosa (Brazil), Illinois State Geological Survey, and the University of Illinois at Urbana-Champaign teamed up to find the arsenic release pathways in arsenic rich soils at gold mining sites in Brazil.

John Scott used ISTC's unique metals speciation detection and analysis techniques to detect arsenic speciation from lab incubated Brazilian soils and discern the difference between leachable and biologically released arsenic. On Day 1 of incubation, they collected the "leachable" arsenic (arsenic that is only weakly sorbed to iron). They found that the dominant arsenic species was As(III), which is considered the most hazardous form of arsenic. However, if there was high concentrations of manganese present, the dominant leachable arsenic was As(V), which is less toxic than As(III).

In addition, as time continued they found that the inorganic species of arsenic (As(III) and As(V)) were converting to organo-arsenic species that are not normally found in terrestrial environments and are not considered to be toxic. The researchers suspected that algae or cyanobacteria had a role in converting the arsenic species based on observed green tint to the soils after incubation. They recommended that remediation strategies could be developed from this knowledge.



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