

Bioremediation of Hexavalent Chromium using Metallophilic Fungi

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PROPOSAL: ASU-03-2018

STATUS: X NEW Continuation

Rationale

- Chromium is commonly found in oxidation states of 3⁺ and 6⁺. In animals and humans Cr3⁺ is an essential trace element; however Cr6⁺ is highly toxic and has been shown to be mutagenic and carcinogenic. Due to its use in broad range of industrial processes such as metal plating, leather tanning, paints, pigments and wood preservation, it has been detected in ground waters across the U.S. Removal and detoxification of Cr6⁺ by microbial process has been know.

Objective

- The objective of this study is to develop a method to use metallophilic fungal hyphae in biofilters for the removal and transformation of Cr6⁺ in water.

Approach

- The removal of Cr6⁺ from water will be investigated in batch and flow through experiments using biofilters.

Approach Uniqueness

- The existing filter are expensive and do not transform Cr6⁺ and the rejected water contain toxic Cr species, re-polluting environment.

Variable

- Fungal types
- Thickness of biofilter. 0.5 mm, 1mm, 2 mm
- Flow rate / contact time
- Test concentration; 10, 50 and 100 mg/L

Key Deliverables

- Development of a biofilter for simultaneous removal and transformation of Cr6⁺
- Biofilter transformation of toxic Cr6⁺ to non-toxic Cr3⁺, thereby reducing the environmental load of Cr6⁺

Budget Requested

- \$25,000

Project Performance

- January – December 2019