



Research & Development Program

New York State Pollution Prevention Institute

Repurposing a Natural Product for Metal Capture and Recovery

This technology has the potential to reduce environmental impacts as well as conserve valuable raw materials, namely heavy metals.

Keywords: Siderophore, yersiniabactin, heavy metal, wastewater, conservation

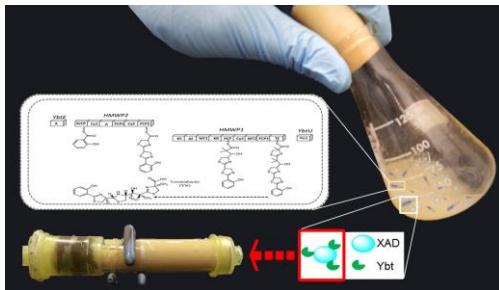
Process Implementation Readiness



Background and Technology Description

Removing heavy metals from wastewater has always been a challenge for industry, particularly metal finishing companies like plating. Researchers at the University at Buffalo (UB) Chemical & Biological Engineering Dept. have developed a heterologous biosynthetic process for producing a siderophore termed yersiniabactin (Ybt) which can chelate multiple metal compounds. While the role of siderophores has been evaluated primarily in the medical research field, UB has identified other applications that take advantage of this metal chelating feature. Not only can metal be removed from wastewater that would otherwise be released to the environment, opportunities to recover and reclaim the captured metal exist with use of Ybt.

As part of the validation effort to demonstrate the superior metal removal capabilities, a special resin was developed which involved immobilization of siderophores onto a polymeric resin (as depicted in Figure).



This application has two potential values. First, an environmental benefit is achieved since metals from either industrial or natural sources can be

sequestered from wastewater as well as drinking water supplies. Second, there is the economic potential to recover valuable metals for re-use within the industrial settings reliant on the metals as raw materials.

Given these two value propositions, a wide range of tests were conducted to evaluate the removal of various metals from both laboratory and industrial water sources, demonstrating the binding and removal of metals such as gallium, copper, nickel, and palladium. Positive results have led to significant project outcomes including participation in several student-led research and entrepreneurial contests (winning or placing in two such efforts) and the formation of a start-up company which successfully secured a National Science Foundation Small Business Innovation Research award.

Technology Benefits and Value

- Biologically-inspired metal removal compound
- Tested utility in metal removal from academic and industrial water samples

Target Customers

Any industry utilizing metals as recoverable raw materials and utility in environmental remediation.

Intellectual Property

One patent application was filed.

Opportunity

NYSP2I is interested in working with qualified parties for product development of this technology.

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