WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2004AK26B

Title: Development of Crab Shell Based Biosorbents for Removing Anionic Metal Complexes From Contaminated Water

Project Type: Research

Focus Categories: Water Quality, Treatment

Keywords: bio-sorption, metal ions, crab shells, mine tailings, metal removal

Start Date: 03/01/2004

End Date: 03/01/2005

Federal Funds: $25,000

Non-Federal Matching Funds: $10,436

Congressional District: AK

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Abstract

Cost effective methods are needed to remove toxic heavy metals from waste streams such as mine tailing leachates. One particularly promising technique, which is both cost effective and efficient, is biosorption. Waste products from other industries can be used as biosorbents.

The proposed project focuses on utilizing waste crab shells from the seafood industry as biosorbents. Crab shells contain chitin, which along with its related compound chitosan can bind heavy metals.

The hypothesis of this research is that due to the availability of positively charged amine groups, crab shell materials will be very effective at removing anionic metal complexes.

A suitable processing method for crab shells will be developed, and metal binding by this material will be compared with commercial chitin, chitosan and ion exchange resins. The effect of important process parameters such as pH and ionic strength on anion removal will be investigated in order to optimize the operating conditions.

The project shall lead to a cost-effective metal removal technique to be used for example by the mining industry to treat tailings. The seafood industry will benefit from a new market for crab shell waste materials.