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Complete Remediation of Groundwater Arsenic Using a Merloc B9, Zerovalent Iron Filtration Column

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Abstract:

In light of the current EPA standard of 10 ppb for arsenic in drinking water, deep wells located in geographic areas where ground waters have historically high concentrations of As (III) are in need of dependable, inexpensive treatment options. To ameliorate this threat, a dithiol compound, Merloc B9, was engineered to bind preferentially to As(III), the more toxic and biologically active form of As. The efficacy of this compound to remove As(III) was first tested in batch laboratory studies. Once the optimal pH treatment range was discovered, a field study column was constructed and tested in West Bengal where pre-treatment As concentrations were as high as 220 ppb and post-treatment As levels were all less than 5 ppb, the detection limit of the instrument used. The Merloc B9-As solid produced in the column is relatively stable over a moderate pH range as demonstrated by 1 wk, 4 wk, and 8 wk leaching studies, leading to a variety of disposal options once the column has exceeded its lifespan.

Impact Statement:

Given the early successes of this study, efforts are currently underway to optimize the attachment of Merloc B9 to a solid support. This will enable the manufacture of an economically viable and permanent means for removal of arsenic from drinking water.

Category: Rural Environmental Protection

Type of Presentation: Oral Presentation