

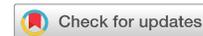
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Research Articles

Microbial-Induced Calcite Precipitation (MICP) for Seepage Control & stabilization of Unlined Channels

Sheikh Abbas Muhammad  & Ajay Singh Jethoo

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Abstract

Seepage control in unlined channels is essential for effective water resource management. To optimize water usage and enhance overall efficiency, minimizing losses incurred through channels is imperative, ensuring their effective performance and the efficient utilization of water resources. This study investigates the application of microbial- induced calcite precipitation (MICP) to reduce seepage in organic soils. A controlled experimental setup introduced a bacterial solution into soil samples, followed by urea and calcium chloride solutions. Calcite precipitation was confirmed through pH monitoring and quantification of calcium carbonate. Results revealed a 24% increase in

calcium carbonate content in treated soil, significantly reducing permeability by a factor of 12. Unconfined compressive strength (UCS) improved by 280%. X-ray diffraction (XRD) and scanning electron microscopy (SEM) supported these findings. MICP presents a sustainable approach for impermeable channel construction with profound implications for water resource management.

Keywords:

Bacillus subtilis bioclogging organic soil sustainable construction unlined channels

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Disclosure statement