

Isolation and Characterization of Urease-Producing Bacteria from Local Natural Sources for Bio-cementation Applications

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Abstract

The poor mechanical properties of soil pose a significant engineering and environmental challenge, affecting the stability of structures and contributing to problems like erosion and land degradation. To address these challenges, current study presenting a promising and sustainable solution through the technology of bio-cementation, depending on Microbial Induced Calcite Precipitation (MICP). This research primarily aims to isolate and characterize urease-producing bacterial strains from diverse environments (soil, water, and air) and to identify the most efficient strains based on their enzymatic activity. That involves isolation ureolytic strains using selective media to isolate the target bacteria, followed by Enrichment culture to enrich the highly active urease-producing bacteria. The urease enzyme activity and stability will measuring under different conditions. Subsequently, the best strains will characterized and analysed using gene sequence analysis and bioinformatics tools. The findings of this research are establish a scientific foundation for future applications in geotechnical and environmental engineering, providing effective bacterial strains for sustainable use, which emerged as a promising topic, due to low cost, high quality, energy saving, and environmentally protective properties.

Index Terms

Urease bacteria, Bio-cementation, Urease production, Microbial biotechnology, Microbial induced calcite precipitation, Microbial concrete