

# Screening of Alkaliphilic Bacteria as Self-healing Agent for Concrete

Rajneesh Vashisht<sup>1</sup>, Sampan Attri<sup>2</sup>, Gunjan Goel<sup>2</sup> and Abhilash Shukla<sup>1</sup>

<sup>1</sup>Department of Civil Engineering, Jaypee University of Information Technology,  
Waknaghat 173234 Solan, Himachal Pradesh, India

<sup>2</sup>Department of Biotechnology and Bioinformatics, Jaypee University of Information Technology,  
Waknaghat 173234 Solan, Himachal Pradesh, India  
E-mail: rajneeshvashishtid@gmail.com

---

**Abstract**—The present study focussed on the screening and identification of calcite precipitating bacteria with a goal to check the suitability of the potential strain in concrete to improve its strength and durability. For this, a total of sixteen samples comprising eight alluvial soil (alkaline in nature and rich in Iron oxide and lime) samples and eight sewage samples were collected from the different locations of district Solan (H.P). For isolation, enrichment culture technique was used to enrich calcite precipitating strains in Urea broth. After enrichment, fourteen distinct bacterial colonies were obtained on Urea agar. All the strains were gram-positive rods or coccus in shape. All the fourteen bacterial cultures were screened for qualitative urease assay and quantitative electric conductivity test. The calcite precipitation was also determined by taking dry weight of the precipitates in urea broth supplemented with calcium chloride. Based on the screening results, five isolates were selected possessing high calcite formation along with higher urease activities (38 – 77  $\mu$ (mhos)/cm). All the results were compared with standard strain of *Bacillus megaterium* MTCC 1684, already reported for high calcite formation. These results indicate that isolated bacterial cultures can be further used in enhancement of strength and durability of concrete and healing of cracks in concrete by calcite formation which will be further analysed by scanning electron microscope and X-Ray diffraction.