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Comparative Study of the Effects of Different Protein Sources on the Self-Healing Capacity of Immobilized Bacteria-Based Concrete †

Devika Menon K [1], Habeeba Rahmath M P [1], Amritha Daniel [1], Biju Jacob [1,*],Vineetha Lekshmy P V [1,*]

[1] Department of Biotechnology and Biochemical Engineering, Sree Chitra Thirunal College of Engineering, Thiruvananthapuram, Kerala, India; k.menondevika@gmail.com (D.M.K.), mphabeeba313@gmail.com (H.R.M.P.), amrithadaniel1998@gmail.com (A.D.);
* Correspondence: bijujacob@sctce.ac.in (B.J); vinithalekshmi@gmail.com (V.P.V);
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Abstract: Cracks in the concrete lead to corrosion, which increases maintenance costs and affects structural integrity over time. In order to sustainably increase the life span, strength, and durability of concrete, biomineralization using microbially induced calcite precipitation (MICP) is used as a promising technique. In MICP, ureolytic bacteria (commonly genus *Bacillus)* are used to fill the cracks by calcium carbonate precipitation. Bacteria increase the resistance to acid attack and water absorption in concrete appreciably.Reserach has shown that direct incorporation of bacteria reduces the viability due to the high pH of concrete. Immobilization of bacterial cells into protective carriers can be a solution. However, the high cost of ingredients in standard media is the main impediment to the successful commercialization of MICP. An eco-friendly, efficient nutrient medium will be a good alternative choice. The present study aims to reflect on the self-healing capacity of concrete formulated with *Bacillus licheniformis* spores immobilized on the rubber-sodium-alginate carrier. The effects of different protein sources-crude and synthetic, on the self-healing capacity of bio-concrete are also reviewed.

Keywords: bio-concrete; bio-mineralization; MICP; immobilization; self-healing capacity; rubber-sodium alginate carrier.

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Conflicts of Interest

The authors declare no conflict of interest.