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Enhancement of strength and durability of concrete by bacterial calcite precipitation

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In the current research work, two bacterial strains were isolated from the alkaline soil samples of a cement factory. They were identified as *Bacillus licheniformis* BSKNAU and *Bacillus flexus* BSKNAU. Experimental investigations were carried out to study the effect of the bacteria on the compressive, split tensile and flexural strengths of concrete. Moreover, the effect of bacteria for improving the durability of concrete was investigated by determining the water absorption, resistance to acid attack and rapid chloride permeability of concrete. The cost effectiveness of bacterial treatment was improved by using wheat bran to replace the costly nutrient broth media for growing bacteria. The optimum bacterial cell concentration was found as 105 cells/ml of mixing water and was added to bacterial concrete specimens during casting. Control concrete specimens were cast with potable water and without any bacterial concentration. The test results revealed that bacterial concrete specimens exhibited higher strength and improved durability performance when compared to control concrete specimens. *Bacillus licheniformis* BSKNAU considerably increased the strength and durability of concrete. Hence it is suitable for use in concrete. *Bacillus flexus* is not a good choice for use in concrete was due to the filling of pores and micro cracks with calcite precipitated by bacteria. The presence of calcite precipitates in bacterial concrete specimens was examined using a Scanning Electron Microscope. The calcite precipitates were confirmed using X-ray Diffraction and Energy Dispersive X-ray Analysis.

Biography

S Krishna Priya has recently submitted her PhD thesis under Anna University, India. She has obtained her BE in Civil Engineering from Periyar Maniammai College of Technology for Women, India and ME in Structural Engineering from Kumaraguru College of Technology, India. She has published four papers in international journals and six papers in national conferences. She is presently working as an Assistant Professor at SNS College of Technology, Coimbatore, India.

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