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Effect of Bioclogging and Biocementation on Permeability and Strength of Soil

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Abstract: Laboratory experiments were conducted to determine the permeability and strength of soil samples before and after bioclogging and biocementation processes. In bioclogging, the extracellular polymeric substance was applied as a thin layer over the surface of the soil placed in the permeameter in three dosages and the constant head permeability study was carried out for two different samples namely silty sand and well graded sand. SEM analysis was done in order to find the presence of Dextran particles filling the voids present in the soil. In biocementation, sand columns are formed and bacterial and cementation solutions are poured to the layers and left for about 2 weeks. The results indicate that though exopolysaccharide was produced it was not penetrated into the soil and plug the voids and therefore no reduction in the permeability of soils was observed. However, unconfined compressive strength test indicates that biocementation resulted in an increase in the strength of soil.

Keywords: Bioclogging, Biocementation, Exopolysaccharide, Dextran, Permeability, Bacterial solution, Cementation solution