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Characterization of the Microbial Induced Carbonate Precipitation Technique as a Biological Cementing Agent for Sand Deposits

Authors : Sameh Abu El-Soud, Zahra Zayed, Safwan Khedr, Adel M. Belal

Abstract : The population increase in Egypt is urging for horizontal land development which became a demand to allow the benefit of different natural resources and expand from the narrow Nile valley. However, this development is facing challenges preventing land development and agriculture development. Desertification and moving sand dunes in the west sector of Egypt are considered the major obstacle that is blocking the ideal land use and development. In the proposed research, the sandy soil is treated biologically using Bacillus pasteurii bacteria as these bacteria have the ability to bond the sand partials to change its state of loose sand to cemented sand, which reduces the moving ability of the sand dunes. The procedure of implementing the Microbial Induced Carbonate Precipitation Technique (MICP) technique is examined, and the different factors affecting on this process such as the medium of bacteria sample preparation, the optical density (OD600), the reactant concentration, injection rates and intervals are highlighted. Based on the findings of the MICP treatment for sandy soil, conclusions and future recommendations are reached.

Keywords : soil stabilization, biological treatment, microbial induced carbonate precipitation (MICP), sand cementation
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