

Cation-crosslinked biopolymer soil treatment and field implementation for slope surface protection

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ABSTRACT

Biopolymer is an environmentally friendly compound produced from natural resources, and recently it has been intensively investigated to modify various engineering properties in soil such as strength, permeability, and erosion resistance (Cabalar et al. 2017; Chang et al. 2015; Kwon et al. 2020). Although biopolymer-soil treatment has positively affected geotechnical engineering performance even with a small dosage to soil mass, several challenges now need to be solved to improve practical sustainability. Biopolymer-soil treatment concerns low strengthening efficiency at a hydrated state and durability under water-exposure conditions (Reddy and Varaprasad 2021). These water-related vulnerabilities in biopolymer-treated soil raise concerns about practical sustainability and narrow down its feasibility in field application. In response, to overcome the issues, this study explored utilization of the cation crosslinking method to enhance strength durability of biopolymer-treated soil. A series of strength evaluation of crosslinked biopolymer-soil mixture in laboratory were conducted. And biopolymer-treated soil was implemented in field for slope surface slope protection *via* compaction method and pressurized spraying method. The cation crosslinking strategy results in increase of strength durability of biopolymer-treated soil and shows sustainable strengthening effect in field even after 1 year of implementation.

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