

Gellan Gum-Bentonite Mixture as a New Vertical Hydraulic Barrier



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Abstract The use of biopolymer, has recently been popularly studied for geo-environmental applications for the past decades. Among the common biopolymers used in laboratory studies, gellan gum has been proved to show effective improvement in the pressurized hydraulic conductivity and the strength of soils. In this study, the application of gellan gum/bentonite grouting for the design of a grout curtain to form a vertical barrier preventing the flow movement has been investigated. Bentonite powder was mixed with hot gellan hydrogel over 100 °C with different gellan gum concentrations (2, 3, and 4% to the mass of distilled water). Tests that show the effects of gellan gum on the changes in water durability, viscosity, and flow controllability of bentonite were conducted. The results of this study show that gellan gum enhanced the engineering properties of bentonite, and in turn, suggests a potential material for vertical hydraulic barriers.

Keywords Gellan gum · Bentonite · Vertical hydraulic barrier

1 Introduction

Biopolymers are polymer synthesized by living organisms (plant, animals, bacteria, fungi, and yeast), which appear as popular additives and admixtures used in food, pharmaceutical, paper, and drilling industries. Later, the geotechnical engineering researchers realize that the use of biopolymers in chemical soil stabilization can overcome concerns and drawbacks of conventional methods such as human health

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