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APPLICATIONS OF BIOPOLYMERS IN DAM CONSTRUCTION AND OPERATION ACTIVITIES

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ABSTRACT

The investigation of innovative and sustainable solutions is a continuing concern within civil engineering activities. The use of environmentally friendly materials in place of traditional chemical substances is a key aspect. Biopolymers are high-molecular-weight molecules produced by many species of biological cells. Biopolymers are recognised as an alternative to conventional chemical polymers because of their potential cost savings, low environmental impact, non-toxicity and non-secondary pollution. Some geotechnical and geoenvironmental applications of biopolymers currently being explored include: cementation of soils to enhance strength; bearing capacity and liquefaction resistance; soil erosion control; reducing hydraulic conductivity; groundwater flow control and remediation of soil and groundwater impacted by metals and radionuclides. This paper reviews reported applications of biopolymers in dam construction and operation activities, highlighting some geotechnical applications that should be investigated further in practice to examine their feasibility and efficiency. The implementations discussed include the biopolymer trench method for construction of filters/drains, the biopolymer slurry technique for installation of permeable reactive barriers, and the treatment of highly turbid raw water in dam reservoirs by coagulation/flocculation processes using biopolymers. Generally, this paper aims to draw more attention to potential applications of biopolymers as potential alternatives to traditionally used chemicals which could lead the construction sector to more sustainable development.