Bacteria Immobilized Electrospun Fibrous Biocomposites for Cr (VI) Remediation in Water

Authors : Omer Faruk Sarioglu, Asli Celebioglu, Turgay Tekinay, Tamer Uyar

Abstract : Fibrous biocomposites were developed by immobilization of a Cr(VI) reducing bacterial strain, morganella morganii STB5, on electrospun polystyrene (PS) and polysulfone (PSU) webs. Cr(VI) removal characteristics of STB5/PS and STB5/PSU fibrous biocomposites were determined at 25 mg L-1 of initial Cr(VI) and 70.41% and 68.27% of removal were observed within 72 h, respectively. Reusability test results indicate that both biocomposites are potentially reusable and can be used for at least 5 cycles. After storage test results suggest that the biocomposites can be stored awhile without losing their Cr(VI) bioremoval capabilities. SEM images of STB5 immobilized PS and PSU webs after the reusability test exhibit strong attachment of bacterial biofilms onto fibrous surfaces. Our results are quite promising and suggesting that reusable bacteria immobilized electrospun fibrous biocomposites might be applicable for Cr(VI) remediation in water systems.

Keywords : electrospinning, polystyrene, polysulfone, Cr(VI) bioremoval, environmental sustainability
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