Abstract

Bioremediation is economical and biofriendly approach used to remediate industrial textile wastewater that possess serious threat to human and environmental health due to its low biodegradability, toxic, mutagenic and carcinogenic nature. The present research was employed to assess the decolorization and biodegradation efficiency of textile reactive dyes by *Acinetobacter baumannii* 1005 bacterial strain and characterization of azoreductase (AZA) gene. Reactive dyes used in this study were reactive blue 224 (RB-224). *A. baumannii* showed significant biodegradation activity against reactive blue 224. The decolorization of RB-224 is reported by change in color from blue to light green color. Under optimum condition biodegradation efficiency of RB-224 of *A. baumannii* was 72% after 24 h. UV-Visible spectroscopy and Fourier-transform infrared spectroscopy (FTIR) was used to confirmed the biodegradation of reactive blue 224. Decrease in absorbance in UV-Visible spectrum (200-1000nm) of treated RB-224 as compared to control confirmed that biodegradation occur. Biodegradation of RB-224 was further evident by FTIR spectra, disappearance of peak at 1020 cm^{-1} representing S=O and reduction in intensity of peaks at 1251,1458, 1681 and 3346 cm^{-1} indicating C-N, C-H, C=C and N-H respectively showed biodegradation of RB-224 into new metabolites. For molecular characterization, AZA gene of 597bp were amplified from *A. baumannii* genomic DNA and successively cloned in pTZ57R cloning vector. Sequencing results showed that AZA gene of *A. baumannii* 1005 has 100% homology with already reported AZA gene of *A. baumannii* (CP043180) available at NCBI GenBank. AZA protein structural analysis showed that it is cytoplasmic protein having ten α helix connected with eight β-pleated sheet and seven random coils in the entire three dimensional globular structure.