**Abstract**

Chitosan (CS) biopolymer was added with low loading silver (Ag) metal nanoparticles to form Ag-CS biopolymer composite. Chitosan is a very promising biopolymer because it is environmental friendly due to its biodegradability and is degraded by enzymes in human body without any toxic effect. The major concern of the study focuses on the synthesis and characterization of the biopolymer composite. Different characterization techniques like X-ray Diffraction Analysis (XRD), Fourier Transform Infrared Spectroscopic analysis (FTIR), Scanning Electron Microscopy (SEM) along with Energy Dispersive X-ray Analysis (EDAX) and UV Spectroscopic analysis, was employed to analyze the nature of the biopolymer composite. The antibacterial activity of the biopolymer composite was also studied.