Abstract

The study is aimed on the antimicrobial potential of manganese oxide nanoparticles (MnO NPs) synthesized using eco-friendly green approach. Hydrogel was prepared using guar gum powder and precursor potassium permanganate was used for the synthesis of MnO NPs. Analytical techniques like UV-visible spectroscopy, Fourier transform infrared (FTIR) spectroscopy, and scanning electron microscopy (SEM) were performed for the optical characterization of synthesized nanoparticles. MnO NPs showed maximum absorption at 285 nm in UV-visible analysis. The absorption peaks of O-H, C-H, and C-O-C bonds were indicated by FTIR analysis in hydrogel spectra while the absorption band of Mn-O or Mn-O-Mn bonds was confirmed by the peak at 600.25 cm^{-1}. SEM images showed morphology of MnO NPs as spherical-shaped with an average particle size in the range 45-85 nm. The antimicrobial activity of synthesized MnO NPs was assessed against three different pathogens of both types gram-positive (*B.subtilis* and *S.aureus*) and gram-negative (*E.coli*). The zones of inhibition produced by nanoparticles were comparable with positive control i.e, Rifampicin. The zones around MnO NPs (concentration 50 and 25 µL) and Rifampicin were (20.83 and 17.1 mm) and 20 mm, (17.6 and 15.3 mm) and 20 mm, and (20.5 and 15.5 mm) and 17 mm against *B.subtilis, S.aureus*, and *E.coli*, respectively. The MIC and MBC values were 2.3 and 4.3, 3.67 and 6, 4 and 5.3 mg against *B.subtilis, S.aureus*, and *E.coli*, respectively.