

Abstract

The aim of this work is to examine therapeutic capabilities of CuO nanoparticles synthesized through a biologically sustainable approach. The hydrogel was acquired via the extraction procedure of Psyllium (*Plantago Ovata*) seeds, whereas the copper oxide nanoparticles was synthesized by utilizing a copper sulphate precursor. Nanoparticles that were manufactured underwent characterization through the utilization of UV-vis spectroscopy and FTIR evaluation. Additionally, scanning electron microscopy was employed to resolved their morphological attributes. The absorption peak at 290 nm within the ultraviolet-visible region was observed in the CuO nanoparticles. The CuO nanoparticles exhibited a peak at 601 cm^{-1} in the Fourier Transform Infrared region. The scanning electron microscopy image reveals the presence of copper oxide nanoparticles within the wavelength range of 9.18 nm. The administration of the antibacterial drug Cefadroxil was performed. The drug loading efficiency of CuO nanoparticles was determined to be 73.7248%. The drug release percentage is 47% at a pH of 6.8 and 34% at a pH of 7.4.