



ABSTRACT

Nanotechnology is one of the emerging techniques which have many applications in different fields of biological sciences including bioremediation, microbial corrosion, bioleaching and bio-mineralization. In the present study biosynthesis of silver nanoparticles by *Aspergillus oryzae*, *Aspergillus niger* and *Aspergillus fumigatus* and their characterization was investigated. Fungal strains were isolated from soil samples and Czapek Dox medium was optimized. Critical parameters such as temperature, pH and silver nitrate concentration were also optimized. *A. oryzae*, *A. niger* and *A. fumigatus* showed optimum growth at temperature 30°C and pH 6±0.7. The silver nanoparticles synthesized by *A. oryzae* and *A. niger* showed maximum absorbance at 420 nm at pH 6 and silver nitrate concentration 5mM but pH 8, AgNO₃ concentration 4mM for *A. fumigatus*. Analytical techniques for the characterization of silver nanoparticles includes UV-visible spectrum, Scanning electron microscope (SEM), Particle size distribution, Fourier transform infrared spectrum (FTIR) and X-ray diffraction. The particle size in the range of 30-80 nm were observed. In case of *Aspergillus oryzae* particle size with 78.2 nm, *A. niger* 29.6 nm and *A. fumigatus* 68.6 nm were observed. Antimicrobial activity of AgNPs synthesized from *A. oryzae*, *A. niger* and *A. fumigatus* showed large zones of inhibition 23 mm, 30 mm and 20 mm respectively against *S. aureus* and less antibacterial activity against *E. coli* (16 ± 2). Antifungal activity showed zones of inhibition of diameter 13 mm, 14 mm and 16 mm for *A. fumigatus* while 11 mm, 12 mm and 13 mm against *A. flavus* respectively. Antibacterial and antifungal activities of silver nanoparticles showed that they are good candidates in the fields of medical and clinical research.
