

Biosynthesis of Zinc Oxide Nanoparticles and Assay of Antibacterial Activity

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ABSTRACT

In this study Out of 280 urinary tract infections samples, 212 (75.7%) bacterial isolates were recovered. Based on, morphological, cultural and biochemical testes, further, confirmed the results by VITEK 2 System there were 54 (30.2%) of gram positive whereas the 158 (69.8%) of gram negative. The bacterial isolates were distributed as *Escherichia coli* followed by *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Staphylococcus epidermidis* which represented 96 (45.2%), 48 (22.6%), 43 (20.3%), 14 (6.6%) and 11 (5.2%) respectively. The synthesis of zinc oxide nanoparticles (ZnO NPs) using biological methods as eco-friendly from the use of *Aspergillus niger* filtrate in the extracellular synthesis, then identified and characterized by UV-Vis spectrophotometer and Scanning Electron Microscopy (SEM). Furthermore, determine the antibacterial efficacy of biological synthesized ZnO NPs against isolated pathogens microbes *Staphylococcus aureus* and *Escherichia coli*. The results found the used of 100 mL of ZnCl₂ in cultivation of *Aspergillus niger* was obtained and biosynthesis of ZnO NPs at 46 mg. SEM was illustrate the morphology and practices of ZnO NPs sizes and appear as spherical in shape besides, the size range at 41-75 nm. The assurance by the UV-Vis spectrum appears the absorption bands of ZnO NPs at 380 nm. The results of 1.0 and 1.5 mg mL⁻¹ from ZnO NPs synthesized from *A. niger* were effect of inhibition against *S. aureus* and *E. coli* bacterial isolated from urine tracts infection sources. The Inhibition Zone Diameters (IZD) against *S. aureus* was appear at 24 and 26 mm, respectively compared with the IZD from ciprofloxacin alone at 20 mm. While the same concentration from ZnO NPs against *E. coli* causing in IZD at 25 and 28 mm, respectively, compared with Ciprofloxacin inhibition alone at 23 mm.

Keywords: Zinc oxide NPs, *Aspergillus niger*, SEM, Antibacterial activity

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