ANTI BACTERIAL ACTIVITY OF COMMERCIAL ANTIBIOTICS AND ZINC OXIDE NANOPARTICLES AGAINST SELECTED UTI PATHOGENS - A COMPARATIVE STUDY

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Abstract: The present study is concerned about the synthesis, characterization of zinc oxide nanoparticles and their use as antibacterial agent. Zinc oxide nanoparticles were synthesized by Co-precipitation method using zinc acetate and thiourea. The synthesized zinc oxide nanoparticles were characterized with X-ray diffraction analysis. The antimicrobial activity of zinc oxide nanoparticle was tested against UTI pathogens like, *Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Proteus vulgaris* and *Staphylococcus aureus* using Well diffusion method. Similarly the antibacterial activity of standard antibiotics was tested against UTI pathogens using the disc diffusion method. The efficiency of zinc oxide nanoparticles was compared with that of standard antibiotics. The results showed that zinc oxide nanoparticles have strong antimicrobial activity against all tested pathogens except *Proteus vulgaris*.

Introduction:

The infectious diseases remain one of the greatest challenges to global health. Urinary tract infection (UTI) is the second most common clinical disease and possesses a significant healthcare burden. This infectious disease can alter the urinary system either structurally or functionally (Foxman, 2010). Worldwide about 150 million people are diagnosed each year with UTI's costing in excess of 6 billion dollars (Gupta *et al.,2001)* . UTI's are predominantly caused by bacteria. The most common bacteria implicated as causative agents of UTI generally originate in the intestine and include but not limited to *E.coli, Pseudomonas spp, Streptococcus spp, Proteus spp., Klebsiella spp., Staphylococcus spp*(El-Sweih *et al*., 2008). About 80 to 90 percent of UTIs are caused by a single type of bacteria *Escherichia coli* (Barnett and Stephens.,1997)

There is an urgent need to produce the new antibacterial agents from different sources. The terrestrial plant such as *Phylanthusamarus* and *Parquetinanigrescens* showed potential antibacterial activity against UTI pathogens(Oluwafemi F and Debiri F.,2008). Moreover, the marine resources such as mangroves, seaweeds, sponges, and sea grasses already showed antibacterial, antifungal(Ravikumar *et al*.,2010) and antiplasmoidal activities(Ravikumar *et al*.,2011).