

Toxicity of CuO, ZnO, TiO₂ and MWCNT Nanoparticles on Human Pathogenic Bacteria

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Abstract

Toxicities of CuO, ZnO, TiO₂ and MWCNT nanoparticles towards human pathogenic bacteria *Bacillus cereus* (Gram - negative) and *Salmonella typhi* (Gram - positive) were determined using serial dilution method on Luria Bertani (LB) agar plate method. The structural and morphological properties of the nanoparticles were characterized using XRD, SEM, EDAX and TEM analysis. The above said human pathogens were inoculated in 20 ml of sterile nutrient broth and it was incubated at 37°C for 12 h. After incubation, the bacterial cultures were treated with nanoparticles (100 µg/ml) and the culture was incubated for 6 hrs. After incubation, 100 µl of culture test tubes was diluted (10¹ to 10⁷ numbers of colonies) and each dilution were taken on LB agar plates using with spreader. The plates were incubated for 24 hours at 37°C. After incubation, the results were observed plates and colonies were counted. *S.typhi*: MTCC733 showed the uncountable colonies for all the nanoparticles. However, a countable bacterial colony for each dilution was observed for *Bacillus cereus*, when treated with ZnO nanoparticles. The CuO demonstrate countable colonies for 10³ - 10⁷ dilution, while TiO₂ & MWCNT demonstrate countable colonies for 10⁵ - 10⁷ dilution plates.

Keywords: Toxicity, nanoparticles, pathogenic bacteria and antibacterial activity