

# Novel Biocompatible Green Copper Nanoparticles Efficiently Eliminates Multidrug Resistant Nosocomial Pathogens and Mycobacterium Species

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**Abstract:** Bacterial infection is a major crisis of 21st era and the emergence of multidrug resistant (MDR) pathogens cause significant health problems. We developed, green chemistry-based copper nanoparticles (G-CuNPs) using Citrus pseudolimon fruit peel extract. G-Cu NPs has a spherical shape in the range of ~ 40 nm with a surface charge of – 31 Mv. This nano-bioagent is an eco-friendly tool to combat menace of MDR. Biochemical tests prove that G-Cu NPs are compatible with human red blood cells and peripheral blood mononuclear cells. There have been many reports on the synthesis of copper nanoparticles, but this study suggests a green technique for making non-cytotoxic, non-hemolytic organometallic copper nanoparticles with a high therapeutic index for possible use in the medical field. On the same line, G-Cu NPs are very effective against Mycobacterium sp. and MDR strains including *Escherichia coli*, *Klebsiella* species, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii* isolated from patient samples. Based on it, we published a patent to Indian Patent Office which can revolutionize the prevention of biomedical device borne infections in hospital pre/post-operated cases. This work could be further explored in future by in vivo experimentation with mice model to direct its possible clinical utility.

**Keywords:** Eco-friendly · copper nanoparticles · Biogenic · Biocompatible · Multidrug-resistance · Human pathogen