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### Original Research Article

## Synthesis and Characterization of Copper Nanoparticles Utilizing Pomegranate Peel Extract and Its Antibacterial Activity

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#### ABSTRACT

Nanotechnology is a fascinating research area as a result of producing nanoparticles with different shapes, sizes, chemical composition, dispersity, and their several applications for the human being. Manipulation, creation, and using metallic nanoparticles is greatly important considering reduction of dimensions. Therefore, unique thermal, electronic, and optical characteristics are obtained. The biosynthesis approaches of nanoparticles are prioritized compared to physical and chemical processes as a result of the lower time costs and energy. Green synthesis of nanoparticles is an eco-friendly technique using natural solvents. The current work includes the eco-friendly, and green synthesis of CuNPs utilizing Cu (NO<sub>3</sub>)<sub>2</sub>. H<sub>2</sub>O solution and Peel of Pomegranate extract. Various bio-components exist in the Pomegranate Peel extract works as a reducing agent for this synthesis. The dominant surface plasmon resonance (SPR) peak achieved at 350 nm in UV-Visible spectra confirmed the formed CuNPs. Based on SEM analysis, the spherical uniformly and morphology sized particles (36.99-55.17 nm) were obtained. The green synthesis of copper nanoparticles mediated by the Pomegranate Peel extract was clearly illustrated by FTIR spectrum. The structural characterization was performed utilizing XRD in line with reflections of the face-centered cubic (fcc) phase of the CuNPs (111, 200, 220, and 400). It was found that biologically synthesized copper nanoparticles effectively controlled the progression of human pathogens, namely Salmonella.

**Keywords:** Biosynthesis; Pomegranate Peel; Nano-particles; Green Chemistry; Cu NPs

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