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Myco-fabrication of Copper and Nickel Nanoparticles and Evaluation of Their Effects Against Antibiotic Resistance Genes in Different Bacterial Strains and Anticancer Potentials

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PURPOSE OF THE ABSTRACT

In the current scenario, developing new compounds with innovative modes of action is desperately needed to tackle the increased emergence of drug-resistant microbes [1]. Recently, metallic nanoparticles gained tremendous attention as potential antibacterial agents [2]. Here, we describe the fabrication of copper and nickel nanoparticles by reducing copper sulfate and nickel sulfate using the endophytic fungus Aspergillus terreus, as a potentially simple and eco-friendly method with low cost. Generally, the microbial synthesis of nanomaterials compared to chemical or physical ones is an attractive and emerging prospect for future sustainable industrial production of nanomaterials. copper and nickel nanoparticles were characterized by Fourier transform infrared spectroscopy. X-ray diffraction patterns revealed their crystalline structure. Dynamic light scattering analysis was applied to study the particle size distribution and stability. Transmission electron microscope studies indicated the morphology of the synthesized NPs. The in vitro antibacterial potentials of copper and nickel nanoparticles were evaluated against five MSRA bacterial strains. Additionally, the in vitro anticancer potentials of copper and nickel nanoparticles were assessed against four types of cell lines; Normal human 14 melanocytes (HFB-4), Human breast carcinoma (MCF-7), Hepatocellular carcinoma (HePG-2) and Pulmonary epithelial cell carcinoma (A549). The obtained results confirmed the activity of the two types of nanoparticles against all the tested cell lines.

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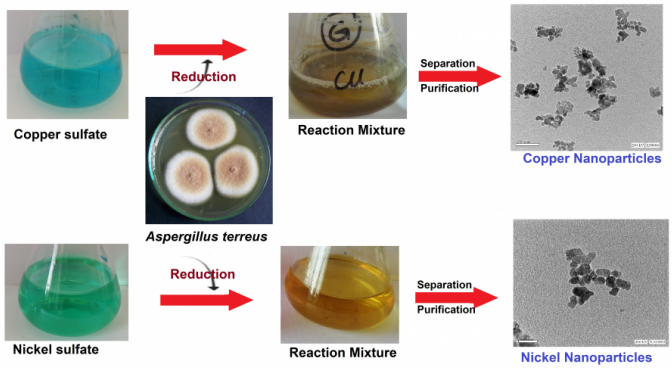
FIGURES



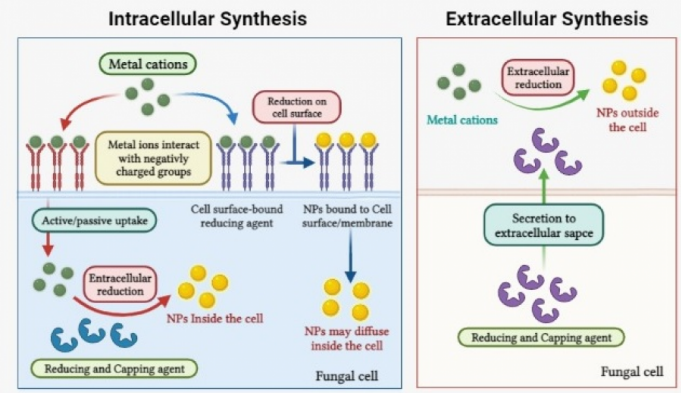


FIGURE 1
Fabrication of Nanoparticles.

FIGURE 2
Schematic representation of the cellular process involved in the fabrication of copper and nickel nanoparticles

KEYWORDS
Biofabrication | Nanoparticles | Reduction and Transformation | Antibacterial and Anticancer

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