

RESEARCH ARTICLE

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Green Synthesis of Silver Nanoparticles Using the Seeds of *Lupinus luteus*: Characterization and Assessment the Antibacterial and Anticancer Activities

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Abstract

Objective: This study aimed to synthesize silver nanoparticles using the aqueous seed extract of *Lupinus luteus* via a green synthesis approach, and to evaluate their antibacterial and anticancer activities against liver and breast cancer cell lines. **Materials and methods:** silver nanoparticles (AgNPs) were synthesized using essential extracts from *Lupinus luteus*. The AgNPs were subsequently characterized using ultraviolet – visible spectroscopy, scanning electron microscopy, and Fourier transform infrared spectroscopy. The biological activities of AgNPs were examined. **Results:** The present study indicates that silver nanoparticles produced of *Lupinus luteus* extracts show an absorption peak at 420 nm, thereby confirming their successful synthesis. A study using scanning electron microscopy (SEM) showed that the nanoparticles' average diameter is 24.72 nm. The biological activities of these nanoparticles were examined, including their antibacterial and anticancer capabilities. Assays include flow cytometry, half-maximal inhibitory concentration (IC₅₀), and minimum inhibitory concentration (MIC) were used in the biological activity evaluation. The nanoparticles caused cell cycle arrest at the S-phase in two human cancer cell lines, HepG2 and MCF-7. **Conclusion:** These results demonstrate how *Lupinus luteus* nanoparticles may be used to create cutting-edge antibacterial and anticancer treatments. Therefore, merit investigation request to develop it functions.

Keywords: *Lupinus luteus*- silver nanoparticles- antibacterial- anticancer

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Introduction

Nanotechnology is playing an essential function in many important fields like chemistry, medicine, physics, biotechnology and materials science especially nanoparticles (NPs) was one of the early development stages of nanotechnology [1]. Any materials with at least one dimension between 1 and 100 nm are referred for being an (NP) in terms of their size and morphology nanoparticles are solid atomic or molecular particles that have superior physical properties to bulk molecules [2]. Due to their ahigh surface to volume ratio and good dispersion in solution, with the ability to handle the majority of the world's health issues. Among the nanomaterials that have been widely employed in the biological areas are metallic nanoparticles (MNPs) [3]. There are three layers that make up NPs: the shell layer, which is chemically and physically different from the core;

the surface layer, which can be maintained with different chemicals, metal ions, emulsifiers, and polymers; and the core, which may be the main part of the NPs. This is because NPs are not made up of simple molecules. Help treat both contagious and long-term illnesses. MNPs have better physiochemical traits than other nanoparticles because they are stronger and can do more [4]. Several metals, including copper, zinc, iron, silver, gold, palladium, platinum, and metal oxides, are used to create MNPs. Many researchers are interested in the creation of silver nanoparticles (Ag -NPs) due to its wide array of antibacterial and therapeutic features. It has been used in medicine to treat many kinds of disease since ancient times [2] it is well recognized fact that silver ions and silver-based compounds have a great microbial killing capacity [5]. However, developments in technology and deeper comprehension of how silver works to prevent disease by killing microbes have created possible its application

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