

## **Abstract**

In this study, silver nanoparticles (AgNPs) were synthesized by reduction of silver ions using benzoin as a radical initiator under UV light. Polyvinyl alcohol (PVA) was used as a stabilizing agent. The morphology and nanoparticle size was studied using spectrophotometer (UV-Vis), X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM) and Fourier transform infrared (FTIR). The UV-Vis spectra of AgNPs represented a peak at 416 nm corresponding to the surface plasmon resonance (SPR). According to the XRD analysis, the size of the AgNPs was found to be in the range of 20-30 nm. The FESEM images showed the spherical shape of nanoparticles. The obtained peaks of FTIR spectra showed the desirable interaction between Ag nanoparticles and OH functional groups in the polymer matrix. Finally, the synthesized AgNPs were evaluated for their antibacterial activities against the Gram-positive (*Staphylococcus aureus*) and Gram-negative (*Escherichia coli*) bacteria. The results illustrated that the tested bacteria were effectively inhibited in the presence of AgNPs.

**Keywords:** Silver nanoparticles; Radical initiator; Antibacterial activities; *Staphylococcus aureus*; *Escherichia coli*



University of Zabol  
Graduate school  
Faculty of Science

Department of Chemistry

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**A new method for synthesis of polyvinyl  
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a radical initiator under UV irradiation and  
study of its antibacterial properties**

**Supervisors:**

Dr. Mansour Ghaffari Moghadam

Dr. Alireza Samzadeh Kermani

**Advisers:**

Dr. Majid Zand Karimi

Dr. Mirza Mohammadreza Sharif Moghaddam

**By:**

Armin Mohmedi Kartalai

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