

## **Biosynthesis, Characterization and Interplay of Bacteriocin-nanoparticles to Combat Infectious Drug Resistant Pathogens**

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**Abstract :** In the past few years, numerous concerns have been raised against increased bacterial resistance towards effective drugs and become a debated issue all over the world. With the emergence of drug resistant pathogens, the interaction of natural antimicrobial compounds and antibacterial nanoparticles has emerged as a potential candidate for combating infectious diseases. Microbial diversity in the biome provides an opportunity to screen new species which are capable of producing large number of antimicrobial compounds. Among these antimicrobial compounds, bacteriocins are highly specific and efficient antagonists. A combination of bacteriocin along with nanoparticles could prove to be more potent due to broadened antibacterial spectrum with possibly lower doses. In the current study, silver nanoparticles were synthesized through biological reduction using various isolated bacterial, fungal and yeast strains. Spectroscopy and scanning electron microscopy (SEM) was performed for the confirmation of nanoparticles. Bacteriocin was characterized and purified to homogeneity through gel permeation chromatography. The estimated molecular weight of bacteriocin was 10 kDa. Amino acid analysis and N-terminal sequencing revealed the novelty of the protein. Then antibacterial potential of silver nanoparticles and broad inhibitory spectrum bacteriocin was determined through agar well diffusion assay. These synthesized bacteriocin-Nanoparticles exhibit a good potential for clinical applications as compared to bacteriocin alone. This combination of bacteriocin with nanoparticles will be used as a new sort of biocide in the field of nano-proteomics. The advancement of nanoparticles-mediated drug delivery system will open a new age for rapid eradication of pathogens from biological systems.

**Keywords :** BAC-IB17, multidrug resistance, purification, silver nanoparticles

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