عنوان مقاله:

Biogenic synthesis and antimicrobial activity of Silver nanoparticle using exopolysaccharides from Lactic Acid bacteria

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خلاصه مقاله:

Nanotechnology provides the ability to engineer the properties of materials by controlling their size, and this has driven research toward a multitude of potential uses for nanomaterials. This study aimed at biosynthesis and characterization of silver nanoparticles (SNPs) using exopolysaccharides (EPS) of lactic acid bacteria (LAB) and the antimicrobial potential of the biosynthesized SNPs against some pathogenic bacteria. EPS production by the EPS- producing Lactobacillus casei (LPW۲E) and Lactobacillus fermentum (LPF۶) using submerged fermentation ranged from ۲۵۶ - ۶۴۰.۹ mg/L. The EPS produced by the two LABs were used for the biosynthesis of SNPs. The SNPs were characterized by colour changes from colourless to yellowish brown and deep brown after ۲۴hrs of incubation. The UV-visible spectrophotometer was further used to characterize the SNPs. The SNPs had strong surface plasmon resonance band at ۵۰۰nm. Scanning electron microscopic (SEM) analysis showed that the SNPs varied in shape and were partially aggregated. The particle size ranged from ۰.۲–۱۰nm and ۰.۰–۱۰nm. The FTIR analysis indicated the presence of functional groups such as hydroxyl, carboxyl, ester, aldehydes among others which may be responsible for the reduction, capping, and stabilization of the SNPs. The SNPs had antibacterial activity against the test pathogens and the zones of inhibition ranged between ۱۲ - ۲۶mm. In conclusion, this study demonstrated that EPS could be used for the production of stable SNPs with antibacterial activity.

کلمات کلیدی:

exopolysaccharides, FTIR, Lactic acid bacteria, SEM, Silver nanoparticles