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Commentary

Antibacterial Activities of *Chrysopogon zizanioides* Root by Nanoparticle Formulations

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DESCRIPTION

The most research is being done in the area of nanoparticle formulations since they are the preferred dose form in the current day. However, due to their small size, nanoparticles can bypass the body's defenses and harm internal organs and tissues. The majority of contemporary research has concentrated only on the therapeutic potential of medications or, occasionally, the efficacy of dose regimens. The preferred method of medicine delivery is oral. Poor physicochemical and biological characteristics of the active medicinal components always impair oral bioavailability. Compared to polymeric nanoparticles, food protein nanoparticles have better biosafety and cost-effectiveness, showing potential for oral medication administration.

Food proteins have lots of hydroxyl, amino, and carboxyl groups, which make it simple to modify the surface of the nanoparticles to give them special capabilities. Food protein nanoparticles, despite being in their infancy, have a tremendous potential to improve the oral bioavailability of a variety of medications, from small molecules to bio macromolecules. In order to spur the creation of oral medication delivery systems based on food protein nanoparticles, factors impacting the efficacy of protein nanoparticles are explored. Silver nanoparticles distinctive antibacterial activity has opened up new possibilities in engineering and technology.

Due to their low cost and distinctive antibacterial action, silver nanoparticles are a useful noble metal in the field of chemical engineering and are well suited for industrial and heterogeneous catalysis. The current study focuses on silver (Ag) nanoparticles that were created using biopolymer. Guar gum, a polysaccharide-based aqueous solution, and a composite polymer mixture made of PVA were employed for capping, stabilizing, and reducing. Furthermore, the size and homogeneity of the nanoparticles were assessed using Transmission Electron Microscopes (TEM). A UV-Visible spectrophotometer was used to quantify the absorbance peak at 413 nm, verifying the creation of nanoparticles. The silver nanoparticles failed to kill the gram-positive (*Staphylococcus aureus*) and gram-negative (*Escherichia coli* and *Pseudomonas aeruginosa*) bacteria. Due to the wide range of industries it is used in, including optoelectronics, biosensors, bio-nanotechnology, and biomedicine, nanoparticle production is expanding exponentially.

Due to the numerous uses for which silver nanoparticles may be used, a number of biological processes are becoming more and more popular. Plant-based nanoparticle synthesis is an economical and ecologically friendly alternative to traditional chemical synthesis. In this work, silver nanoparticles are produced using an aqueous extract of the root of *Chrysopogon zizanioides*. Various techniques, including as transmission electron microscopy, UV-Vis absorbance spectroscopy, photoluminescence, and antibacterial activity, were utilized to characterize silver nanoparticles. The synthesized nanoparticles had a spherical shape and, when seen under a transmission electron microscope, were typically between 10 and 20 nm in size.

The UV-Vis spectrum of an aqueous solution that contained silver provided evidence of their presence by showing an absorption peak at around 411 nm. Finally, it was demonstrated that the biosynthesized silver nanoparticles had a strong antibacterial effect on the human pathogens gram-positive *Staphylococcus aureus* and gram-negative *Pseudomonas aeruginosa*. Adiponectin (AP), particularly in its multimeric form, has a favourable impact on preserving metabolic homoeostasis and is strongly linked to diabetes, obesity, cardiovascular disease, and cancer. The Poly (Lactic-co-Glycolic Acid) (PLGA)/ Polyhydroxybutyrate (PHB) nanoparticles may be used to simulate multimeric AP by anchoring the AP monomer to the surface because of the hydrophobic connection of the polyhydroxyalkanoate granules binding protein (PhaP) region in the protein's tail.

CONCLUSION

The multimeric AP mimetic particles can upregulate NF-B and have no discernible effect on AMPK in muscular or endothelial cells, which is similar to earlier research on the genuine multimeric form of AP. The cell cycle of MCF7 cancer cells was affected differently by the nanoparticles than by AP monomer. The ob/ob mice's serum glucose and serum glycoprotein levels are decreased as a result of the multimeric AP nanoparticles' activation of PI3K, AKT, and the multimeric AP receptors T-cadherin. Due to its capacity to control glucose metabolism, it could be a useful method for controlling blood sugar levels in people with diabetes or obesity.

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