

## Study of Antimicrobial Effect of Silver Nanoparticles Synthesized by Green methods for Using in Antimicrobial Food Packaging

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**Background & Objectives:** Silver nanoparticle has been attracting considerable attention due to its antimicrobial effect recently. One of the silver nanoparticle applications is their usage in antimicrobial food packaging. Nanoparticles are synthesized in different Methods that among them, green synthesis Methods is more interesting due to using natural materials such as the starch and b- D-glucose that are environmentally friendly, non-toxic and cheap, in addition to having antimicrobial effect. Since the presence pathogenic and putrefactive food bacteria is important, finding Methods to control them is necessary. In this context, nowadays probiotic bacteria are used as food additives because of their therapeutic effects. Antimicrobial effect of silver nanoparticle on some of probiotic bacteria that used in food such as *Lactobacillus fermentum* ATCC 9338, *Lactobacillus plantarum* ATCC 8014 and food pathogen bacteria such as *Staphylococcus aureus* PTCC 1431 was studied.

**Methods:** Silver nanoparticles synthesis was done by using solutions of starch, AgNO<sub>3</sub> and b -D-glucose which are dissolved. After complete dissolution at 40 °C and then their synthesis was studied by UV-vis absorption spectrum. Therefore, study of antimicrobial effect on said probiotic and pathogen bacteria by dilution tube Methods and colony count in solid media was done.

**Results:** Study of synthesized silver nanoparticle in UV-vis absorption spectrum showed that it has absorption of 0.5 in 420nm wavelength which proves synthesis of nanoparticles. Also, investigation of antibacterial effect of these nanoparticles demonstrates they have bacteriocidal effect on *Staphylococcus aureus* PTCC 1431 and bacteriostatic effect on probiotic bacteria.

**Conclusion:** Considering high antimicrobial effect of these silver nanoparticles against food-borne pathogen bacteria and less effect against used probiotic, these silver nanoparticles with polymers can be used in antimicrobial food packaging. Antimicrobial effect of nanoparticles depends on concentration of nanoparticles, physiology, intracellular metabolisms and selective permeability of membranes and cell wall bacteria.

**Keywords:** Green Synthesis; Silver Nanoparticles; Probiotic; *Lactobacillus fermentum* ATCC 9338; *Lactobacillus plantarum* ATCC 8014; *Staphylococcus aureus* PTCC 1431