

## **In vitro antimicrobial activity of green synthesized silver nanoparticles against selected gram-negative foodborne pathogens**

### **ABSTRACT**

Silver nanoparticles (AgNPs) used in this study were synthesized using pu-erh tea leaves extract with particle size of 4.06 nm. The antibacterial activity of green synthesized AgNPs against a diverse range of Gram-negative foodborne pathogens was determined using disk diffusion method, resazurin microtitre-plate assay (minimum inhibitory concentration, MIC), and minimum bactericidal concentration test (MBC). The MIC and MBC of AgNPs against *Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella Typhimurium*, and *Salmonella Enteritidis* were 7.8, 3.9, 3.9, 3.9 and 7.8, 3.9, 7.8, 3.9  $\mu\text{g/mL}$ , respectively. Time-kill curves were used to evaluate the concentration between MIC and bactericidal activity of AgNPs at concentrations ranging from 0 $\times$ MIC to 8 $\times$ MIC. The killing activity of AgNPs was fast acting against all the Gram-negative bacteria tested; the reduction in the number of CFU mL<sup>-1</sup> was >3 Log<sub>10</sub> units (99.9%) in 1-2 h. This study indicates that AgNPs exhibit a strong antimicrobial activity and thus might be developed as a new type of antimicrobial agents for the treatment of bacterial infection including multidrug resistant bacterial infection.

**Keyword:** Gram-negative; Antimicrobial activity; Foodborne pathogens; Silver nanoparticles; Tea leave extracts; Time-kill curves