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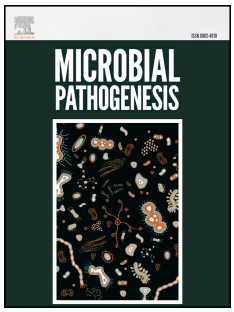

Limonia acidissima L. leaf mediated synthesis of silver and zinc oxide nanoparticles and their antibacterial activities

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Limonia acidissima L. leaf mediated synthesis of silver and zinc oxide nanoparticles and their antibacterial activities

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Abstract
Green chemistry is a novel method for the synthesis of silver and zinc oxide nanoparticles. The present investigation focused on synthesis of biogenic silver and zinc oxide nanoparticles. They were assayed for their antibacterial activities against test bacterial species. The results revealed that the silver nanoparticles showed the maximum zone of inhibition 15.16, 15.5 and 13.33 mm at 400 µg/mL to *S. aureus*, *S. typhi* and *P. aeruginosa* respectively, when compared to the Erythromycin. While zinc oxide nanoparticles showed less activity in comparison to silver nanoparticles owing to the agglomeration of nanoparticles. It is evident from our investigation that silver nanoparticles could be used as an antimicrobial due to their intrinsic properties in biomedical application and food packing industries.

Keywords: *Limonia acidissima* L.; Silver nanoparticles; Zinc oxide nanoparticles; Endocytosis; Reactive oxygen species (ROS).

1. Introduction

Nanotechnology is an emerging area of research for manipulation of dimension of materials less than 1 nm with varying sizes and shapes. Different methods are in vogue for synthesis of nanoparticles. Chemical and physical synthesis of nanoparticles involve hazardous chemicals and high energy consumption which affects the environmental quality [1,2]. Biological methods are nontoxic, environmental friendly and involve the use of micro-organisms [3], algae [4], plant extracts [5–7], agro-wastes [8–20], enzymes [21–26], arthropods [27] and pigments for the synthesis of nanoparticles [28–33]. Silver, zinc oxide, gold and copper nanoparticles were used for antimicrobial activity [3]. The antimicrobial activity of silver known since time immemorial [34,35]. Silver has been used as a disinfectant to prevent the human infection in the medical field because of its natural antimicrobial activity towards many