Synthesis, Characterization, and Antibacterial Properties of Silver Nanoparticles Prepared from Aqueous Peel Extract of Pineapple, *Ananas comosus*

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ABSTRACT

Biosynthesis is a simple, environmentally friendly, and cost effective approach to prepare metallic nanoparticles. This study attempted to synthesize colloidal silver nanoparticles (AgNPs) using pineapple peel extract as a reductant, as well as a stabilizer, and investigated their antibacterial activities. The synthesized AgNPs were characterized by UV-Vis spectrophotometry, X-ray diffraction energy dispersive X-ray analysis, transmission electron microscopy, and Fourier transform infrared spectroscopy. The results showed that the prepared AgNPs were nearly spherical in shape with sizes ranging from 10 to 55 nm; they demonstrated a surface plasmon resonance peak at 445 nm. The biosynthesized AgNPs were crystalline in nature with face-centered cubic symmetry. However, Ag_2O/AgO was observed in the synthesized AgNPs. The phytochemical present in pineapple peel extract was found to be responsible for the reduction and stabilization of the biogenic AgNPs. Furthermore, the antibacterial activity of AgNPs against selected pathogenic bacteria using disc diffusion assay revealed that the AgNPs effectively inhibited the growth of both Pseudomonas aeruginosa and Staphylococcus aureus.

Keywords: *Ananas comosus,* Antibacterial activity, Peel extract, Pineapple, Silver nanoparticles

INTRODUCTION

Silver, utilized as an antiseptic agent since ancient times, is of increasing interest due to its toxicity against a broad spectrum of bacterial strains, particularly in light of the rise of bacterial resistance to antibiotics (Feng et al., 2000). With the proliferation of nanotechnology in materials science, silver nanoparticles (AgNPs) have exhibited astonishing properties, leading to many electronic, catalysis, sensor, and therapeutic applications (Janardhanan et al., 2009; Som and Karmakar, 2011; Shukla et al., 2012). Due to wide-spectrum antimicrobial ability, AgNPs have been popularly used in cosmetics, clothing, consumer products, water