Microwave-assisted green synthesis of Ag nanoparticles using leaves of Melia Dubia (Neem) and its antibacterial activities

ABSTRACT

The biosynthesis methods of nanosilver are of interest due to its low cost and environmental friendliness compared with chemical and physical methods. This study will conduct a green synthesis of nanosilver by decreasing the AgNO3 using leaf extract with the presence of stabilized microwave irradiation and collagen. Melia dubia leaves, and hydrolyzed fish scale collagen were utilized as reducing and stabilizing agents, respectively. Ag nanoparticles (AgNPs) were synthesized and characterized via Uv-Vis spectroscopy, scanning electron microscope (SEM) that attached with energydispersive X-ray, X-ray diffraction (XRD), and antibacterial activities. Results showed that the spherical shape of AgNPs was formed with particle size ranging from 72 nm and 100 nm. UV–vis analysis revealed that the absorbance peak was observed at 446 nm, which corresponded to AgNPs. XRD analysis confirmed the natural crystalline of AgNPs with a particle size of 84.8 nm. The antimicrobial analysis was conducted using Staphylococcus aureus and Escherichia coli as Gram-positive and -negative bacteria, respectively. Results showed the inhibition zone against both bacteria, which indicated excellent antimicrobial properties of the samples.

Keyword: Microwave-assisted; AgNPs; Melia dubia (neem); Antibacterial