

ABSTRACT

The present study has reported the biofabrication of silver nanoparticles from the reduction of silver nitrate and methanolic extract of parietin which is a metabolite present in the lichen *Xanthoria parietina* as a reductant and also a stabilizer. Extraction of parietin from lichen biomass was carried out by performing the parietin assay. Parietin extract was made by optimizing different parameters viz. 1.5 g of lichen biomass suspended in 15 ml of methanol incubated for 45 min at 37°C. Biosynthesis of parietin mediated AgNPs was done by adjusting the procurement period at 30 min with 3 ml volume of 3 mM AgNO₃ conc. Visual observations and ultraviolet-visible (UV-Vis) spectra showed that the color of fresh methanolic extract turned into greenish-brown after treatment with Ag precursors. Lichen secondary metabolites were determined by Fourier transfer infrared (FTIR) spectroscopy. X-ray diffraction (XRD) pattern and scanning electron microscopy (SEM) also confirmed the successful synthesis of *Xa*-AgNPs. The antibacterial activity of both free parietin extract and synthesized nanoparticles known as *Xa*-AgNPs were tested against gram +ve (*Staphylococcus aureus*, *Bacillus subtilis*) and gram -ve (*Escherichia coli*, *Pseudomonas sp.*) bacteria using the agar well diffusion method. The results revealed that both the cases showed potential antibacterial activity against gram +ve and gram -ve bacteria. Antiproliferative activity of both free parietin extract and synthesized *Xa*-AgNPs were investigated in human thyroid cancer cells (TPC1 and 8505C) cell lines. *Xa*-AgNPs inhibited cell proliferation and induced apoptosis by expression of cell cycle regulating gene and by the extrinsic and intrinsic cell death pathways. The current findings revealed that *Xa*-AgNPs had potent cell death abilities. Therefore, they might be taken as a promising candidate to combat bacterial infections and some cancer cells.