

Anti -oxidant, anti -bacterial and anti-biofilm activity of biosynthesized silver nanoparticles using Gracilaria corticata against biofilm producing K. pneumoniae

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Abstract

Silver nanoparticles (Ag NPs) with anti -bacterial effects against the biofilm-producing bacteria *Klebsiella pneumoniae* (*K. pneumoniae*) were synthesized using the marine seaweed *Gracilaria corticata* (*G. corticata*). Physicochemical characterization using UV -spectrometer, fourier transform infrared spectroscopy (FTIR) and X- ray diffraction (XRD) confirmed that the synthesized material consisted of Ag NPs. Morphological analysis using scanning electron microscopy (SEM) and transmission electron microscopy (TEM) with energy -dispersive X-ray (EDX) analysis confirmed the shape, size, surface morphology, and available chemical composition of the Ag NPs. Furthermore, the rich phenolic and flavonoid content of *G. corticata* has excellent antioxidant activity, which was confirmed through gas chromatography -mass spectrometry (GC -MS) analysis. The highest anti-bacterial activity and biofilm reduction (88 %) of Ag NPs treated *K. pneumoniae* was observed at 50 µg/mL and 100 µg/mL concentrations respectively. The bacterial viability and exopolysaccharide production of *K. pneumoniae* significantly decreased after treatment with Ag NPs. Morphological alterations and intracellular damage

Palabras clave

Palabras clave de autor: [Marine seaweed](#); [Silver nanoparticle](#); [Antioxidant activity](#); [Minimum inhibition concentration](#); [Biofilm metabolic activity](#); [Toxicity effect](#)

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