



SEAWEED-MEDIATED *In vitro* GREEN FABRICATION OF SILVER NANOPARTICLES: DETERMINATION OF THE POTENCY OF ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY

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ABSTRACT

Free radicals mediated diseases are becoming more persistent in the world. This has led to the frequent cases of cancer, cardiovascular diseases and diabetes around the globe. Additionally, in the past few decades a prominent rise in bacterial infections has greatly increased the mortality rates all throughout the world. Although miscellaneous synthetic antioxidants are available, chronic exposure to these synthetic antioxidants result in severe consequences. Therefore, scientific research has focused on discovering more reliable treatment methods with fewer side effects. Seaweeds a type of marine macro algae have exhibited significant health benefits in traditional seaweed consumers. Comprehensive research reveals seaweeds have demonstrated with potent antioxidant and antimicrobial activity. Silver nanoparticles synthesised different plant extracts expresses enhance antioxidant and antimicrobial features. This study emphasises on determining the antioxidant and antimicrobial activity of seaweed mediated green fabrication of silver nanoparticles. The water extracts of six species of fresh seaweeds were utilised for the synthesis of the silver nanoparticles. Silver nanoparticles were successfully synthesised for 5 species of seaweeds. The characterisation of the synthesised silver nanoparticles accomplished with UV-Visible Spectroscopy. The antioxidant activity of water extracts and the silver nanoparticles were determined with Total Flavonoid Assay, Total Phenolic Content, Total Antioxidant Content, 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay, 2,2-azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) assay and ferric reducing antioxidant power (FRAP) assay. The antimicrobial activity was determined against *Escherichia coli* and *Staphylococcus aureus* through well diffusion. The results reveal *Turbinaria ornata* seaweed species to have the highest antioxidant activity among water samples. A precise sample exhibiting substantial antioxidant activity for silver nanoparticles was not identified. A higher antibacterial activity against *Staphylococcus aureus* was observed than for *Escherichia coli*.

Keywords: Green synthesis, Silver nanoparticles, Seaweeds, Antioxidant activity, antimicrobial activity