

Green Synthesis of Zn Nanoparticle (ZnO NPs) Using Palmyrah Resource and Evaluation of Its Antimicrobial Property

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Borassus flabellifer is a tree found in the tropical belt of Sri Lanka and almost all parts of the tree can be used for various purposes like food, medicine, and others. Mostly, the leaf has been used to make handicraft items and is popularly known for this only but other than this, there is a potential for the leaf being used for various purposes. Only very few studies were conducted to evidence the medicinal importance of palmyrah leaf. The aim of this work is associated with plant-mediated nanoparticle synthesis through developing low-cost, eco-friendly processing using palmyrah leaf extract and zinc sulphate and sodium hydroxide as precursor solution. The artificial synthesis of ZnO is assisted by chemical processing and leaving several hazardous effects on the world. The nanoparticles synthesized were characterized using X-ray diffraction analysis and the antibacterial activity was evaluated by the agar well diffusion method. The X-ray diffraction (XRD) spectrometer was used to determine the crystalline size of nanoparticles synthesized as 20 ± 6 nm at the wavelength of 517 nm. Antimicrobial activity for two different concentrations of ZnO nanoparticles (50 and 100 mg/ml) was studied for *Escherichia coli*. A significant inhibition activity was observed for the tested two concentrations and the maximum activity (18 mm) was observed from the highest concentration. An attempt is employed for the synthesis of ZnO nanoparticles using leaf extract of *Borassus flabellifer* in an environmentally friendly manner. In this green nano-particle synthesis process, palmyrah leaf extract has functioned as a reducing and capping agent. Green aspects of ZnO nanoparticle synthesis could be recommended as an alternative to high thermal chemical processing. Further characterization for associated phytochemical compounds and any toxic factor will assist to incorporate this nanoparticle for developing any value-added product from palmyrah in the future.

Keywords: *Borassus flabellifer*; ZnO nanoparticle; XRD analysis; Antibacterial activity