

Biogenic Synthesis of ZnO Nanoparticles Using *Annona muricata* Plant Leaf Extract and Its Anti-Cancer Efficacy

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Abstract : Green nanoparticles have gotten a lot of attention because of their potential applications in tissue regeneration, bioimaging, wound healing, and cancer therapy. The physical and chemical methods to synthesize metal oxide nanoparticles have an environmental impact, necessitating the development of an environmentally friendly green strategy for nanoparticle synthesis. In this study, we used *Annona muricata* plant leaf extract to synthesize Zinc Oxide nanoparticles (Am-ZnO NPs), which were evaluated using UV/Visible spectroscopy, FTIR spectroscopy, X-Ray Diffraction, DLS, and Zeta potential. Nanoparticles had an optical absorbance of 355 nm and a net negative surface charge of ~ -2.59 mV. Transmission Electron Microscope characterizes the Shape and size of the nanoparticles. The obtained Am-ZnO NPs are biocompatible and hemocompatible in nature. These nanoparticles caused an anti-cancer therapeutic effect in MIA PaCa2 and MOLT4 cancer cells by inducing oxidative stress, and a change in mitochondrial membrane potential leads to programmed cell death. Further, we observed a reduction in the size of lung cancer spheroids (act as tumor micro-environment) with doxorubicin as a positive control.

Keywords : Biomaterials, nanoparticle, anticancer activity, ZnO nanoparticles

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