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## **Biosynthesis of zinc oxide nanoparticles using *Albizia lebbbeck* stem bark and evaluation of its antimicrobial, antioxidant and antiproliferative activities on human breast cancer cell lines**

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**B**iocompatibility and stability of zinc oxide nanoparticles (ZnO NPs) synthesized using plants is a promising research area of study in nanotechnology, due to its wide applications in biomedical, industrial, cell imaging and biosensor fields. The present study reports the novel green synthesis of stable ZnO NPs using various concentrations of zinc nitrate 0.01, 0.05, 0.1 M, and *Albizia lebbbeck* stem bark extracts as an efficient chelating agent. Antimicrobial, antioxidant, cytotoxic and antiproliferative activities of the synthesized nanoparticles on human breast cancer cell lines were evaluated using different assays. The UV-vis spectroscopy result revealed an absorption peak in the range of 370 nm. The involvement of *A. lebbbeck* bioactive compounds in the stabilization of the ZnO NPs was confirmed by X-ray diffraction (XRD) and Fourier transform infrared (FTIR) analysis.

Zeta sizer studies showed an average size of 66.25 nm with poly disparity index of 0.262. Scanning electron microscope (SEM), Energy-dispersive X-ray spectroscopy (EDX) analysis results, revealed irregular spherical morphology and presence of primarily Zn, C, O, Na, P and K respectively. The biosynthesized ZnO NPs revealed strong antimicrobial potentials against various Gram negative and Gram-positive bacterial pathogens. Antioxidant activities carried out using H<sub>2</sub>O<sub>2</sub> free radical scavenging assay revealed higher IC<sub>50</sub> values of 48.5, 48.7 and 60.2 µg/mL for 0.1 M, 0.05 M, 0.01 M ZnO NPs respectively. Moreover, the biosynthesized ZnO NPs showed significant cytotoxic and antiproliferative effects on MDA-MB 231 and MCF-7 breast cancer cell lines in concentrations dependent manner.

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