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Rapid and green microwave-assisted synthesis of zinc oxide nanoparticles using aqueous *Phoenix dactylifera* L. (Date palm) wood extract and evaluation of antibacterial and antifungal activities

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Nanoparticles exhibit completely new or improved properties with larger particles of the bulk materials and these novel properties are derived due to the variation in specific characteristics such as size, distribution and morphology of the particles. Nanoparticles present a higher surface area to volume ratio with decrease in the size, distribution and morphology of the particles. Recently, synthesis of NPs via eco-friendly routes have become popular among researchers due to its low cost, synthesis in ambient atmosphere, non-toxicity, environmental compatibility etc. and ease of applications as the resulting particles are highly soluble in water, biocompatible, and devoid of toxic stabilizers. Among the diverse biosynthetic approaches, the use of plant extracts has compensation such as easily available, safe to handle and possess a broad viability of metabolites. The phytochemicals responsible for

the synthesis of nanoparticles are Terpenoids, flavonoids, carbohydrates, saponins, alkaloid and protein. In the present study, Zinc Oxide nanoparticles (ZnO NP) were synthesized from palm date wood extract (*Phoenix dactylifera* L.) in a rapid and eco-friendly microwave-assisted synthesis from zinc nitrate solution. Microwave parameter (irradiation time), wood extract and silver nitrate concentration were optimized. The UV-visible spectroscopy was used to monitor the ZnO NP formation through sampling at time intervals, phyto-synthesized zinc oxide nanoparticles dimensions were characterized using X-ray diffraction analysis. The green synthesized nanoparticles exhibited potent antibacterial activity against the pathogenic bacteria, as evidenced by their zones of inhibition and also a good antifungal activity against the *Candida* fungus.

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