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Green Synthesis of Zinc Oxide Nanoparticles and Their Pharmacokinetic Properties

Anushka Mhatre¹, Komal Patil², Pratibha Mhatre³, Kajal Gharat⁴, Asmita A. Tupe⁵

Student P. G. Department of Chemistry, Veer Wajekar ASC Collage Phunde, Uran, Raigad¹⁻⁴ Ph.D Research Scholar, Department of Home Science, NIILM University, Kaithal, Haryana⁵

Abstract: In recent decades, the use of nanoparticles across various industries, including biomedical, cosmetics, and food, has gained significant global attention due to their nanoscale dimensions and exceptional properties. This has made nanotechnology a highly sought-after research field. Among the different synthesis approaches, green chemistry-based methods have emerged as a sustainable alternative, leveraging natural biological reduction processes to minimize the use of hazardous chemicals, unlike conventional physical and chemical techniques. Among inorganic nanoparticles, zinc oxide (ZnO) nanoparticles have garnered considerable interest due to their wide bandgap, high exciton binding energy, ease of fabrication, biocompatibility, non-toxic nature, and eco-friendly characteristics. ZnO nanoparticles readily dissolve in biological fluids and have a tendency to aggregate under varying physiological conditions. However, their physicochemical properties play a crucial role in determining bioavailability. This review aims to explore and summarize the green synthesis of zinc oxide nanoparticles and their pharmacokinetic properties.

Keywords: nanoparticles, zinc oxide, biocompatibility, green synthesis, pharmacokinetics, bioavailability



