

SILVER AND ZINC NANOPARTICLES BIOSYNTHESIS USING LAUREL EXTRACT AND INVESTIGATION OF THE PHOTOCATALYTIC PROPERTIES

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Abstract. Metal nanoparticles that are widely studied in optoelectronics, catalysis, medicine, and sensors, offer remarkable optical and electronic properties. To address the cost and environmental concerns associated with their synthesis, this study employs an environmentally friendly method using *Laureus nobilis* extract to produce silver and zinc nanoparticles, which are prominent in nanotechnology. This study includes investigations of factors such as reaction time, AgNO₃/laurel ratio, and temperature in nanoparticle biosynthesis to optimize the process. The next stage was set to evaluate the photocatalytic performance of these nanoparticles, specifically against the methylene blue dye under the dark and UV light conditions. Parameters such as pollutant decomposition, degradation rate, catalyst stability, and nanoparticles recovery were analyzed. Structural characterisation of the obtained nanoparticles was performed using UV-vis, FTIR, SEM and XRD techniques. The photocatalytic results showed significant degradation percentages for LB-AgNP (97.5%) and LB-ZnNP (90.9%). LB-ZnNP showed superior performance. Therefore, LB-AgNP and LB-ZnNP are promising photocatalysts for water purification and elimination of toxic organic pollutants.

Keywords: biosynthesis, silver, zinc, nanoparticle, photocatalysis.