

## Effect of green synthesized CuO plate-like nanoparticles in photodegradation and antibacterial activities

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### Abstract

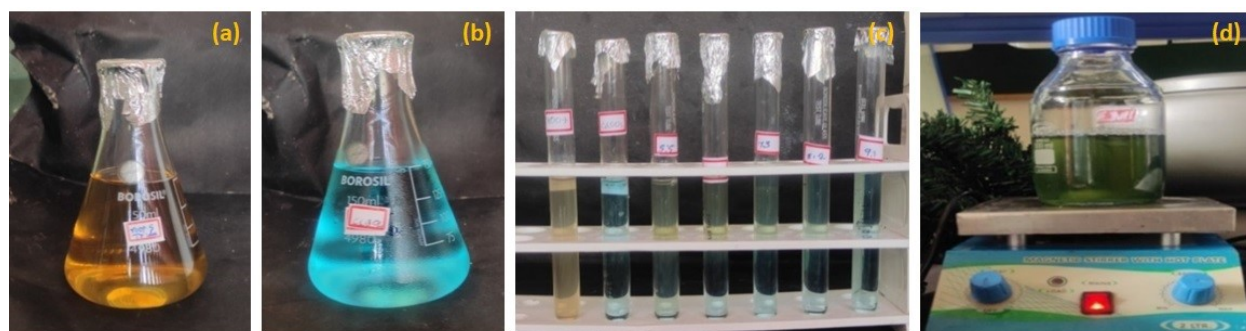
Green synthesis of copper oxide nanoparticles and its effects on photocatalytic dye degradation and antibacterial activities are reported in this work. Synthesis of nanoparticles by green routes provides many advantages over the chemical routes. This green synthesis is a simple, cost-effect and fast process without use of any costly or harmful chemicals. Tridax procumbense (coat buttons) plant's root extract was used to synthesis copper oxide nanoparticles. The synthesized Tridax procumbense-copper oxide nanoparticles (TP-CuO NPs) were characterized using UV-visible spectroscopy, Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), transmission electron microscopy (TEM), dynamic light scattering spectroscopy (DLS) and X-ray Diffraction (XRD) techniques. Synthesized TP-CuO NPs was applied for photocatalytic dye degradation and antibacterial activity studies. The TP-CuO nanoparticles exhibited maximum antibacterial activity for 500 µg/mL concentration against *S.aureus* and *E.coli* showing inhibition zones of 7.5 mm and 7.2 mm, respectively. Photocatalytic ability of the TP-CuO was also tested against textile dye Trypan blue (TB), it showed about 55 % after 48 hrs for 500 µg/mL of CuO NPs concentration showing concentration dependent

degradation efficiency. It is the first work on Trypan blue derived CuO nanoparticle's study in photocatalytic and antimicrobial applications. In overall, this study supports superiority of eco-friendly green synthesized TP-CuO NPs as photocatalytic and antimicrobial agents.

**Keywords:** Tridax procumbens; Copper Oxide nanoparticles; Green synthesis; Antibacterial activity; Photodegradation; Dye removal.



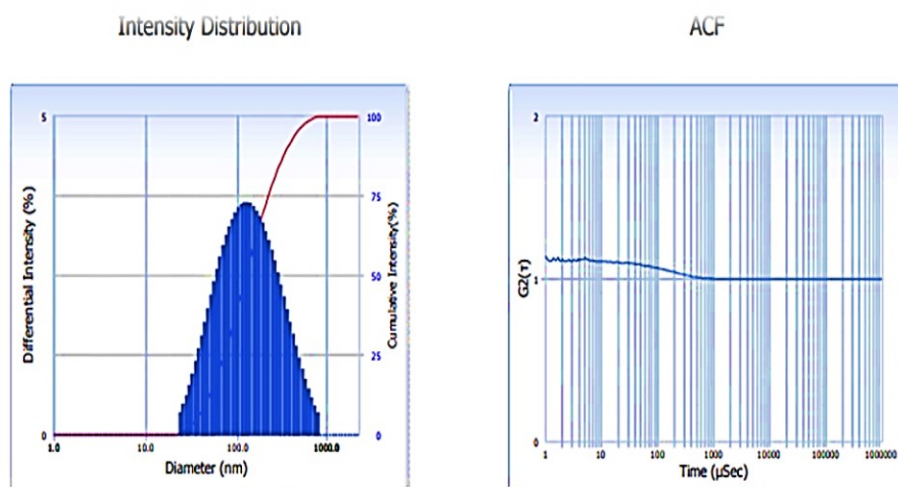
**Figure S1. (a) Tridax procumbens plant, (b) Plant root and (c) Dried excised plant roots**



**Figure S2. (a) Plant root extract, (b) 0.05M of  $\text{CuSO}_4$ , (c) incubated different concentration solutions and (d) final root extract and  $\text{CuSO}_4$  mixed solution**



**Figure S3. TP-CuO Nanoparticles**



**Figure S4. Zeta Size and Potential of CuO NPs**