

Green synthesis of copper nanoparticles using *Allium cepa* (onion) peels for removal of Disperse Yellow 3 dye

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ABSTRACT

Textile effluent contains an enormous range of colors and heavy metals. When transferred directly to the environment without any further treatment, it stupendously harms the environment by disrupting chemical, biological, and nutritional aspects. Due to their unique physical, chemical, and biological characteristics, low cost, and environmentally friendly nature, copper nanoparticles (Cu NPs) have recently received substantial attention for photocatalytic decolorization of wastewater contaminants. The creation of copper nanoparticles using onion peel extract is the major goal of this investigation. The characterization of produced nanoparticles was done using scanning electron microscopy and X-ray diffraction. Using various optimization parameters, the synthesized copper nanoparticles were used to decolorize the Disperse Yellow 3 dye. The chosen dye was degraded to its greatest extent (73.7%) at the ideal experimental conditions (0.01% dye, 0.01 g/L copper nanoparticles, pH 5, and 50°C). The reductions in chemical oxygen demand and total organic carbon were calculated to be 70.22% and 69.23%, respectively. The current study suggests that copper nanoparticles might be used to filter out other toxic dyes from the textile effluents.

Keywords: *Allium cepa* (onion) peels; Copper nanoparticles; Scanning electron microscopy and X-ray diffraction, Disperse Yellow 3 dye, Chemical oxygen demand; Total organic carbon

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