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PROF. DR. HÜLYA ÇİÇEK

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SYNTHESIS OF NANOPARTICLES USING THE GREEN SYNTHESIS METHOD, DOPING THEM INTO FIBERS AND INVESTIGATING THEIR PHOTOCATALYTIC POTENTIAL

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ABSTRACT

Nanotechnology has recently become a frequently used manner to increase the efficiency of wastewater treatment. Nano metal/metaloxides have a great potential in the photocatalytic degradation of pollutants in water. The "green synthesis" of nanoparticles uses reagents that are non-toxic, environmentally friendly and safe, compared to other traditional methods. For this purpose, various plant extracts have been considered as alternative and eco-friendly substances to replace the use of chemical compounds due to their reasonable cost and eco-friendly nature. In this study, Ag and Cu nanoparticles were synthesized by the green synthesis method based on the use of extracts of myrtle leaves. In addition, fiber with high added value was obtained from corn casings, which is waste biomass, and the synthesized nanoparticles were doped into the resulting fibers. The effectiveness of both nanoparticles and nanoparticle-doped fibers in the photocatalytic removal of crystal violet (CV) dye from the water was investigated. Response surface methodology was used to determine the effectiveness of the myrtle leaf extracts in the photocatalytic degradation of CV and the experimental variables, such as hydrogen peroxide concentration, treatment time and nanoparticle amount were optimized. The surface properties of the obtained nanoparticles were evaluated by SEM and FT-IR analyses, and their crystal structures were elucidated by XRD analysis.

Keywords: Green synthesis, nanoparticle, photocatalysis, fibers

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