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## SYNTHESIS OF COPPER OXIDE NANOPARTICLES OBTAINED FROM BLACKBERRY (*Rubus fruticosus*) LEAVES AND THEIR USE IN ENVIRONMENTAL SAMPLES

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### Abstract

The efficacy of an environmentally friendly synthesis method for the removal of paracetamol residue from wild blackberry leaves was investigated in the context of this study. The synthesis involved the formation of copper oxide (CuO) nanoparticles. The dimensions of the nanoparticles were determined to be between 11 and 26 nanometers, with a spherical and crystalline structure. The elemental analysis revealed that the material contained 95% CuO. The pharmaceutical active ingredient paracetamol was removed from wastewater using copper oxide nanoparticles (CuONPs). The advanced oxidation process (UV/H<sub>2</sub>O<sub>2</sub>) was employed to remove the target pharmaceutical substance, which was analyzed using HPLC (high performance liquid chromatography device). The results demonstrated that the UV/H<sub>2</sub>O<sub>2</sub> process achieved a 97% removal rate. Furthermore, the copper ion remaining in the environment after paracetamol removal was quantified and found to be 419.6 µg L<sup>-1</sup>. A kinetic model study was conducted, and it was determined that the method was suitable for the pseudo-second-order kinetic model. In addition to being environmentally friendly, this method is also economical and easy to implement.

**Key words:** blackberry leaves, copper oxide, green synthesis, nanoparticle

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