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## COMPARATIVE STUDY OF COPPER NANOPARTICLES TOXICITY ON TWO FRESHWATER MICROALGAE SPECIES

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### Abstract

The objective of this study was to compare the toxicity of copper nanoparticles (CuNPs) on two freshwater microalgae species, namely the unicellular green algae *Chlorella vulgaris* and the cyanobacteria *Microcystis aeruginosa* KG. The experiments were performed using 0, 0.01, 0.05, 0.1, 1, and 5 ppm concentrations of CuNPs, which were added into a flask containing 145 mL culture medium for algae growth (CB) and 5 mL biomass of each algae. The capacity to generate biomass and change the cell structure of the two strains was measured in days: D0, D2, D6, and D10. CuNPs were synthesized via chemical reduction. The nanomaterial was characterized to have a spherical shape with an average size of around 30-40 nm and was well distributed without aggregating in solution. The results demonstrated that CuNPs have different effects on the growth of the two species of algae. CuNPs aggregated together to change the *C. vulgaris* cells, thereby increasing their biomass. On the contrary, at concentrations 1 and 5 ppm, *M. aeruginosa* KG strain was inhibited after 6 and 10 days. The techniques used to characterize material structure of CuNPs, namely SEM, TEM, EDX, and XRD, demonstrated that CuNPs were detected via the appearance of numerous small black dots on the CuNPs-treated cell with 10.36% and 0% Cu content for *M. aeruginosa* KG and *C. vulgaris*, respectively.

**Keywords:** *Chlorella vulgaris*, copper nanoparticles, effect, inhibition, *Microcystis aeruginosa* KG,

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