

Polyphenol and Phytochemical Analysis of *Azadirachta indica*, *Lantana camara*, and *Croton laccifercus*: Screening of Potential Plant Candidates for Green Synthesis of CU Nanoparticles

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Abstract

The green synthesis of metallic nanoparticles is more popular due to its eco-friendly and sustainable approach. Plant extracts with bioactive components, such as flavonoids and polyphenols can reduce metal ions to nanoparticles while other secondary metabolites including alkaloids, phenylpropanoids, and saponins act as a capping agent to minimize the agglomeration. This study aims to assess the phytochemical composition of *Lantana camara*, *Azadirachta indica*, and *Croton laccifercus*, to determine their potential for green synthesis of nanoparticles. Water extracts of these plants were subjected to qualitative analysis of flavonoids, alkaloids, tannins, phytosterols, saponins, proteins, and glycosides using qualitative tests: Wagner's Test, Ferric Chloride test, Salkowski's test, Frothing test, Biuret test, and Keller-Kiliani test respectively. The total polyphenol content was determined using the Folin-Ciocalteu test. The results showed that *Lantana camara* and *Azadirachta indica* had the highest flavonoid content, with *Azadirachta indica* having the highest phytosterols level and reducing sugars content. *Croton laccifercus* and *Azadirachta indica* exhibited the highest alkaloid concentration. In terms of total polyphenol content, *Azadirachta indica* had the highest concentration (3.99 mg GAE/g), followed by *Lantana camara* (3.96 mg GAE/g), *Croton laccifercus* (3.09 mg GAE/g). All three plants extracts showed promising potential as bio-reductants for the green synthesis of nanoparticles, with *Azadirachta indica* standing out due to its strong phytochemical profile, making it the most suitable candidate for efficient nanoparticle synthesis.

Keywords: *Capping agents, Phytochemical composition, Bio-reductants, Green synthesis, Nano particles*