

## Anti-tyrosinase Activity of Green Synthesized Silver Nanoparticles from Aqueous Extract of *Nelumbo nucifera* Petals

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### Abstract

Since green synthesis is simple, inexpensive, less time-consuming and eco-friendly, it is highly accepted over chemical synthesis in the pharmaceutical and cosmetic industries. This involves nontoxic secondary metabolites of plants, which could function as reducing and capping agents during nanoparticle synthesis. This study utilized a petal extract of *Nelumbo nucifera* (Lotus) to reduce silver nitrate solution into silver nanoparticles (AgNPs). Then, the anti-tyrosinase activity of AgNPs was tested. Fourier transform infrared (FTIR) spectroscopy and ultraviolet-visible (UV-Vis) spectroscopic analysis confirmed the presence of secondary metabolites in petal extract. The AgNPs were characterized using UV-Vis, FTIR and Scanning Electron Microscopic (SEM) techniques. The UV-Vis spectrum of AgNPs showed the characterized excitation of maximum surface plasmon resonance band at 435 nm. FTIR spectroscopy analysis established that the petal extract served as a reducing agent and acted as a capping agent to stabilize the NPs. SEM revealed the formation of well-dispersed and spherical shape NPs ( $\approx 80$  nm). The tyrosinase inhibitory activity of AgNPs was evaluated spectrophotometrically using mushroom tyrosinase, L-tyrosine, potassium phosphate buffer and  $\pm$  arbutin as a positive control in the 96-well microplate. The percentage inhibition of tyrosinase was calculated. The percentage inhibition of AgNPs (0.1 mg/ml) and  $\pm$  arbutin (0.1 mg/ml) were found to be 56.38% and 65.27% respectively. When compared with  $\pm$  arbutin significant ( $p < 0.05$ ) percentage inhibition of tyrosinase enzyme was observed from green synthesized AgNPs. The study concluded that green synthesized AgNPs could be developed into a potential candidate in the pharmaceutical and cosmetic industries. Further, more studies are needed to elaborate quality, safe and efficacious utilization of green synthesized AgNPs.

**Keywords:** *Green synthesis, Tyrosinase, Secondary metabolites*