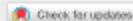


Eco-friendly green synthesis of silver nanoparticles using *Luffa acutangula*: synthesis, characterisation and catalytic degradation of methylene blue and malachite green dyes

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Received 23 Jan 2022, Accepted 16 Mar 2022, Published online: 12 Apr 2022

 Cite this article  <https://doi.org/10.1080/03067319.2022.2060089>



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ABSTRACT

In this study, catalytic-degradation of dyes such as methylene blue (MB) and malachite green (MG) was carried out by using silver nanoparticles (AgNPs), obtained by adopting the flower extract of *Luffa acutangula* (LA). The biogenic synthesised LA-AgNPs were characterised by using UV-Vis spectroscopy, Fourier-transform infrared spectroscopy (FTIR), DLS (dynamic light scattering) with zeta potential analysis, X-ray diffraction (XRD) and high-resolution transmission electron microscopic(HR-TEM) analyses. The typical surface plasmon resonance peak of LA-AgNPs was observed at 428 nm, as confirmed from UV-Vis spectrum. The formation of LA-AgNPs was observed through colour transformation from pale yellow to dark-brown due to the reduction of Ag^+ . Synthesised LA-AgNPs displayed spherical shape and face-centred cubic structure with an average size of 10–30 nm. The effects of various parameters such as initial extract concentration, time and time process were studied. The degradation reactions of MB and MG are found to follow the Langmuir–Hinshelwood mechanism with a pseudo-first-order kinetic model. Biogenic synthesised LA-AgNPs showed good degradation ability to reduce the MG and MB with $NaBH_4$.

Q KEYWORDS: [Luffa acutangula](#) [silver nanoparticles](#) [dynamic light scattering](#) [dye degradation](#)

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