

## Amino Acid Coated Silver Nanoparticles: A Green Catalyst for Methylene Blue Reduction

**Authors :** Abhishek Chandra, Man Singh

**Abstract :** Highly stable and homogeneously dispersed amino acid coated silver nanoparticles (ANP) of  $\approx 10$  nm diameter, ranging from 420 to 430 nm are prepared on AgNO<sub>3</sub> solution addition to gum of Azadirachta indica solution at 373.15 K. The amino acids were selected based on their polarity. The synthesized nanoparticles were characterized by UV-Vis, FTIR spectroscopy, HR-TEM, XRD, SEM and <sup>1</sup>H-NMR. The coated nanoparticles were used as catalyst for the reduction of methylene blue dye in presence of Sn(II) in aqueous, anionic and cationic micellar media. The rate of reduction of dye was determined by measuring the absorbance at 660 nm, spectrophotometrically and followed the order: Kcationic > Kanionic > Kwater. After 12 min and in absence of the ANP, only 2%, 3% and 6% of the dye reduction was completed in aqueous, anionic and cationic micellar media respectively while, in presence of ANP coated by polar neutral amino acid with non-polar -R group, the reduction completed to 84%, 95% and 98% respectively. The ANP coated with polar neutral amino acid having non-polar -R group, increased the rate of reduction of the dye by 94, 3205 and 6370 folds in aqueous, anionic and cationic micellar media respectively. Also, the rate of reduction of the dye increased by three folds when the micellar media was changed from anionic to cationic when the ANP is coated by a polar neutral amino acid having a non-polar -R group.

**Keywords :** silver nanoparticle, surfactant, methylene blue, amino acid

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