

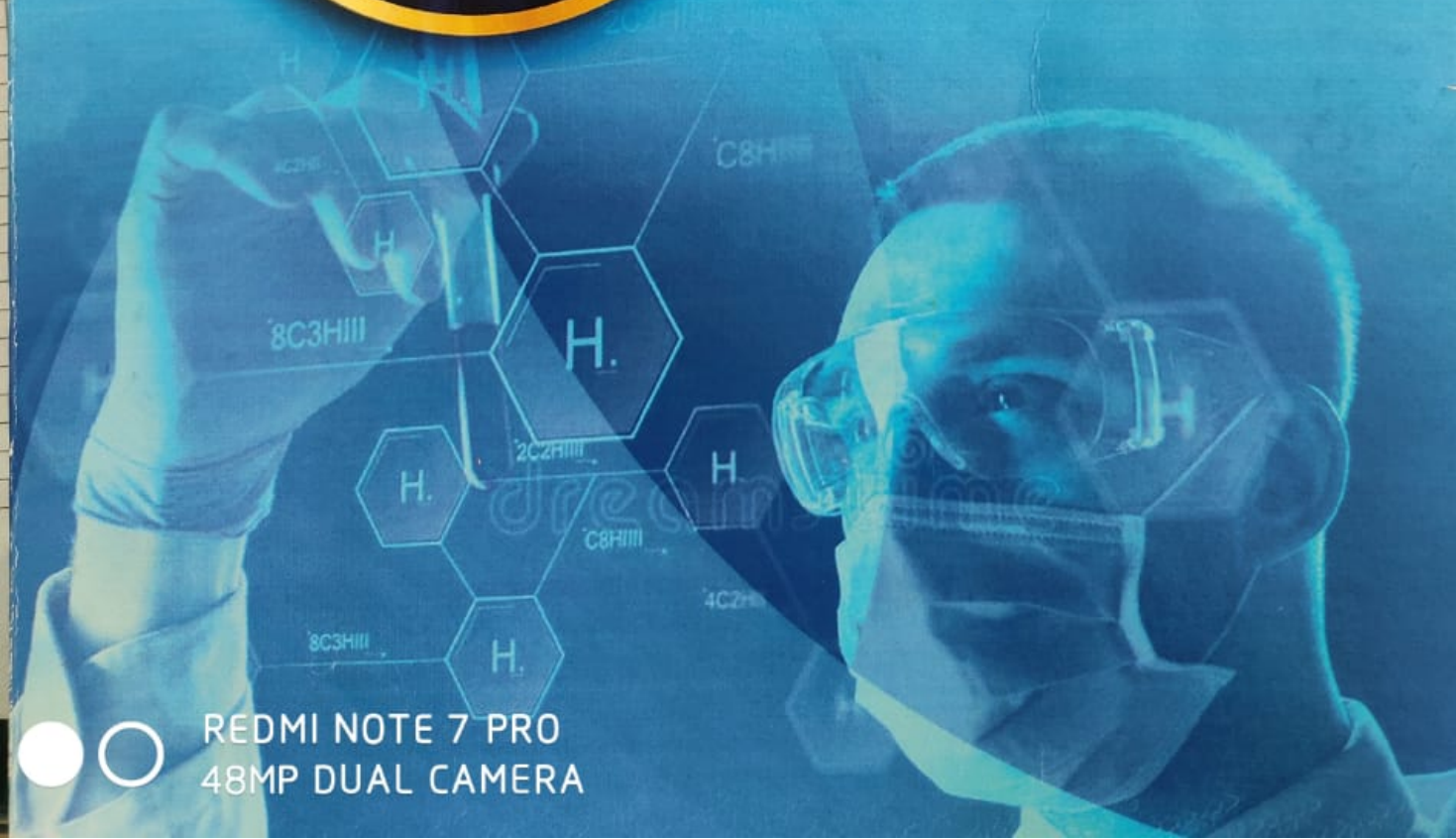


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## **A Facile Green Synthetic Route to Silver Nanoparticles Using a Green Algae *Chlorella ellipsoidea* and Investigation of Their Photophysical, Catalytic Activities**

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**Abstract:** The green synthetic approaches are environment friendly chemical processes which reduce or even eliminate the generation of hazardous substances. A simple, convenient and green method is employed for the synthesis of silver nanoparticles (Ag-NPs) using dried biomass of a green alga, *Chlorella ellipsoidea*. The formation of silver nanoparticles has been confirmed from its surface plasmon band at 436 nm and size and shape of the particles is determined from TEM. The TEM images showed the nanoparticles to be nearly spherical in shape with sizes in the range of 3–13 nm. The synthesised bioactive Ag-NP exhibited a high photocatalytic activity for the degradation of methylene blue dye (MB).

### **Introduction**

Nano materials show unique properties different from structures of same material composition at other scale range. Biosynthesis of metal nanoparticles using plants have received current attention as a suitable alternative to chemical procedures and physical methods [1]. For example microalgae which are sunlight-driven cell factories primarily found in aquatic environments whose lipid extracted deoiled biomass such as of *A. dimorphus* has been used for the synthesis of Ag NPs [2].

Metal nanostructures such as silver nanoparticles (Ag NPs) exhibit unique and tunable surface plasmon properties ease of surface functionalization, extremely high surface to volume ratio and catalytic effects [3]. Though silver nanoparticles are mainly used as catalyst or as an antibacterial/antifungal agent it shows diverse application ranging from targeted drug delivery and molecular imaging to water treatment. Silver NPs have been found to be active against filariasis and malaria vectors, plasmodial pathogens and cancer cells [4].