***Calendula officinalis*-mediated biosynthesis of Silver Nanoparticles and their Electrochemical and Optical Characterization**

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The metal nanoparticles synthesis is highly explored field of nanotechnology. The biological methods seem to be more effective. A simple and elegant method is adopted to prepare Silver nanoparticles (AgNPs) in a single step using *Calendula officinalis* extract (COE) as reducing and stabilizing agent. The plant extract is mixed with AgNO₃ to get biosynthesized AgNPs. The biosynthesized AgNPs were both optically and electrochemically characterized by UV–Vis, Infrared spectroscopy, Transmission Electron Microscopy, Fluorescence spectroscopy, Zeta potential and Cyclic Voltammetry. The results showed *Calendula officinalis* extract is a useful bioreductant for the synthesis of AgNPs. This study infers that the size of biosynthesized AgNPs ranges from 30 to 50 nm. The surface plasmon resonance peak in the UV-Vis absorption spectra shows maximum absorption at 435 nm. Fluorescence spectra of silver nanoparticles, which show an emission peak at ~468 nm have also been studied. Zeta potential analysis ensured the biosynthesized AgNPs are highly stable. Using this environmentally friendly method of biological AgNPs production supplies rates of biosynthesis facile in comparison with other chemical and engineered routes. The employment of traditional medicine in biosynthesis protocols can

potentially open new doors in various human health and well-being implications such as cosmetics, foods and medicine.

Keywords: silver nanoparticles (AgNPs), biosynthesis, *Calendula officinalis* extract.

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