



# PLANT BASED NANOPARTICLES AND THEIR POTENTIAL APPLICATIONS



**V. K. Linima\* , R. Rangunathan, Jesteena Johnney**

Department of Biotechnology (Bionanotechnology), Centre for Bioscience and Nanoscience Research, Eachanari, Coimbatore – 641021, Tamilnadu, India.

[\\*linimaathul@gmail.com](mailto:*linimaathul@gmail.com)

## Abstract

In recent years, plants have gained significance due to their unique constituents and versatile applicability across various research and development fields. Medicinal plants, known for their historical use in treating human ailments, have emerged as valuable sources of bioactive compounds. Many prescribed drugs derive from these sources, finding diverse applications in medical sciences. This study focuses on biologically synthesizing iron and silver nanoparticles using aqueous leaf extracts separately obtained from *Ricinus communis*, *Centella asiatica*, and *Desmodium triflorum*. The leaf extracts underwent characterization through antioxidant activity, TLC analysis, and phytochemical analysis. GC-MS analysis of the extracts revealed the antioxidant potential of phytoconstituents, showcasing diverse biological functions. The synthesized iron and silver nanoparticles underwent analysis using various techniques, including UV-Vis absorption spectroscopy, Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), scanning electron microscopy (SEM) with energy dispersive spectroscopy (EDS), and transmission electron microscopy (TEM). The antimicrobial activity of these nanoparticles was evaluated through the well diffusion method, determining the minimum inhibitory concentration (MIC) using the 96-well plate method. Moreover, the anticancer activity of the leaf extract-mediated iron and silver nanoparticles was assessed using human retinoblastoma cell lines.

Keywords: Green synthesis, FeNPs and AgNPs, GC-MS, TEM, Antimicrobial activity, anticancer activity