**ABSTRACT**

In the emerging field of nanotechnology, a goal is to make nanostructures or nano arrays with special properties with respect to those of bulk or single particle species. The development of reliable, sustainable, and ecofriendly protocols for manufacturing a wide range of metal and metal oxide nanoparticles became a necessary one. Biosynthesis of MO NPs using leaf extracts is rich in bioactive compounds, they are considered as an excellent source for nano particle biosynthesis. The plant source extracts are believed to act as both reducing and stabilizing agents in nano particle synthesis, considered as simple, green and cost-effective methods. In the present work, plant mediated synthesis of metal nanoparticles and characterization and find out the potential applications. ZnO nanoparticles were prepared by using plant leaves extract of *AcalyphaIndica*. The phytochemicals present in the plants reduces zinc chloride into ZnOnano particles. From the UV- visible spectrophotometric analysis, the band observed around 374nm was identified as “surface Plasmon resonance band” and this band is ascribed to excitation of valence electrons of ZnO arranged in the nanoparticles (nanocrystal/ nanosphere).The size of particles formed were around 90 nm to 110 nm as studied by the particle size analyzer. SEM images of the ZnO sample shows that agglomeration has been taken place. The particle shape is to some extend spherical and the zeta potential measured shows that the surface potential of NPs is about 25mV.