**Abstract**

Green synthesis of metal nanoparticles is an important technique in the methods of eco-friendly nanoparticle production. The synthesis of silver nanoparticles was accomplished using Ocimum sanctum leaf extract at room temperature. These particles were then encapsulated with polyvinyl alcohol (PVA) polymer matrix. The presence of silver was confirmed by different characterization techniques such as UV-vis spectroscopy, Fourier transform infrared spectroscopy (FTIR) and X-Ray Diffraction (XRD). Scanning electron microscopic (SEM) images of the synthesized powder shows spherical shaped silver nanoparticles embedded in sponge-like polymer matrix. The energy dispersive X-ray analysis confirms the presence of elemental silver along with iron signal. Energy dispersive signal corresponding to elemental iron has been attributed to O. sanctum plant. The silver nanoparticles in PVA matrix thus obtained shows high antibacterial activity against gram positive Staphylococcus aureus (S. aureus) and gram negative Escherichia coli (E. coli) water borne bacteria. The inhibition zone against S. aureus and E. coli were also calculated.