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**Name of Supervisor** : Prof. Tasneem Fatma

**Name of Department/Centre:** Biosciences

**Topic of Research** : Synthesis of zinc oxide nanoparticles facilitated by cyanobacteria for biological applications

**Summary:**

Zinc oxide nanoparticles (ZnO NPs) have gained tremendous interest due to their potential use as chemotherapeutic and antimicrobial agents. In the present study 30 cyanobacterial extracts were screened for ZnO NPs synthesis. The color change of the reaction mixture from blue to pale white indicated the synthesis of ZnO NPs. It was further confirmed by UV–Visible spectroscopy that showed the absorption peak at 372 nm. The SEM analysis during screening revealed that *Oscillatoria sp.* synthesized smallest ZnO NPs (~40 nm) that were further optimized for their higher yield by altering reaction conditions (pH, temperature, reaction time, concentration of extract and metal precursor). Best conditions for ZnO NPs synthesis are (0.02 M zinc nitrate, 10 ml of extract volume, pH 8, at 80 °C for 3 h). After optimization size of ZnO NPs reduced from 40 nm to 20-25 nm confirmed by TEM analysis. Purification of optimized ZnO NPs was done through calcination at 350 °C for 2 h and characterized by UV–Vis, FTIR, XRD, SEM-EDAX, TEM, AFM, Zeta potential and DLS analysis. Further biogenic ZnO NPs were tested for biological (antioxidant, antimicrobial, biofilm inhibition, antidiabetic, anti-inflammatory, biocompatibility, anticancer) and environmental (dye degradation) applications.