ABSTRACT

In this research work, Zinc oxide (ZnO) nanoparticles were synthesized from *Cenchrus setigerus* Vahl and *Cenchrus pennisetiformis* Hochet & Steud by using 100mM Zinc sulfate heptahydrate salt ($ZnSO_4.7H_2O$) as a precursor and aqueous extract of grasses as a reducing and caping agents for synthesis of ZnONPs. The synthesis of ZnONPs from these grasses were confirmed by visually observed colour change. The further characterization was done by UV-Visible spectroscopy, Fourier Transform Infrared Spectroscopy (FT-IR) analysis, X-Ray Diffraction (XRD) Pattern analysis and Scanning Electron Microscope (SEM) with Energy Dispersive X-Ray (EDX) analysis. UV-Vis's spectroscopy of Green synthesized ZnONPs from *Cenchrus setigerus* and *Cenchrus pennisetiformis* were revealed distinctive peaks at 372 nm and 363nm, respectively. The crystalline particle size was 9.91nm and 4.60nm for ZnONPs of *Cenchrus setigerus* and *Cenchrus pennisetiformis* respectively, which was determined by XRD. SEM revealed the Hexagonal and spherical shape of ZnONPs and EDX analysis showed the higher percentage of zinc and oxygen in ZnONPs of both these grasses. The significant antibacterial activity of ZnONPs of *Cenchrus setigerus* and *Cenchrus pennisetiformis* at three different concentrations (500 µg/ml, 700 µg/ml and 900 µg/ml) were observed against gram positive bacteria (*Bacillus subtilis, Staphylococcus aureus*) and gram-negative bacteria (*Escherichia coli, Klebsiella pneumoniae*) by using agar well diffusion method. Herbal handwash was prepared by methanolic extract of *Azadirachta indica* and *Ocimum basilicum* along with other ingredients and checked its antibacterial activity against skin pathogens. Comparative analysis of antibacterial activity was done between herbal handwash and herbal handwash incorporated with ZnONPs of *Cenchrus setigerus* and *Cenchrus pennisetiformis* against skin pathogens. It was noted that efficacy of herbal Handwash incorporated with ZnONPs of grasses against pathogens was more effective than simple herbal handwash.