ABSTRACT

In the present research work both green and chemical synthesis of nanoparticles was done. The SEM analysis indicated that green ZnO NPs were hexagonal in shape and chemically synthesized nanoparticles were cubic to spherical in shape. The size of green ZnO NPs was 17.28 nm and chemical ZnO NPs were of 18.03 nm. The FTIR analysis indicated that the functional groups attached to green ZnO NPs were SI-OR, COO^-, COOH, NH, CO^- and OH^- group while chemical ZnO NPs were having functional groups attached with them including SI-OR, COO^-, COOH and CO^- functional group. The comparative toxicological effects of chemically synthesized ZnO NPs, green ZnO NPs and Zn salt on juvenile *Cyprinus carpio* were studied. For this purpose LC_{50} was calculated in seven days experiment and then an experimental design was established for the estimation of sub acute toxicity assay. After a week fish were dissected to check the oxidative stress caused by green, chemical ZnO NPs and Zn salt. Oxidative stress was determined by chemical analysis of catalase, GST, GSH and LPO activities. Creatinine level was also observed in blood serum of the fish *Cyprinus carpio*. There was a remarkable change in the treated groups when the results were compared with control group. Results showed that the toxicity effect of chemical ZnO NPs on the CAT, LPO, GST and GSH activity was more than green ZnO NPs. The Creatinine level was also high in fish exposed to chemical ZnO NPs. Histopathological investigation proved that the effect of chemical nanoparticles was worse than green ZnO NPs. It was concluded that chemical nanoparticles can be replaced by the green nanoparticles. This replacement can limit the toxic effect of nanoparticles when they get accumulated in high amounts in water bodies.