

## Abstract

In present investigation, total ten mushrooms were collected for exploring the diversity of mushrooms from Chagharzai Forest, Buner, KP. These mushrooms were characterized on the basis of morphological, anatomical features and characterized under the scanning electron microscopy, as well as on molecular basis. Out of these three selected mushrooms specimen were also studied under FTIR analysis, antioxidant activity, And one mushroom *Lactarius sanguifluss* were studied under FTIR analysis, antioxidant, antibacterial and anticancer activity. *Lactarius sanguifluss* was used for mycosynthesis of ZnO nanoparticles and prepared nanoparticles were characterized by UV, XRD and FTIR characterization techniques. Selected nanoparticles was used for anticancer activity in female mice. It was a in vitro test, that was done by few researchers in Pakistan . Present research also contain comparison studied of results of antioxidant, antibacterial and anticancer activity of prepared ZnONPs, simple mushroom extract and both combination of ZnONPs and mushroom extract. The basic aim of this detailed study was to enhance and improve the existing literature about the mycosynthesis of nanoparticles from mushrooms and diversity of Mushrooms in Pakistan and to provide a better understanding for coming mycologist.