

ABSTRACT

In the present study, Barti Raj Forest, Chagharzai Valley, District Buner, KP, Pakistan was explored for its fungal flora. During the investigation, 5 mushrooms belonging to 74 families were collected, characterized and biologically screened for their pharmacological activities (antimicrobial, antioxidant and anticancer potential). Fourier Transform Infrared spectroscopic analysis *Clitocybe* sp. BRC-36, *Inocybe* sp. BRC-4, *Russula emetica*, *Russula* sp. BRC-18a and *Suillus bovinus* showed the presence of different antioxidant functional groups. *Inocybe* sp. BRC-4 was used for the green mycosynthesis of Cu-Ag myconanoparticles. Different structural characterization of Cu-Ag myconanoparticles i.e. XRD, UV Vis and FTIR was done. *Inocybe* sp. BRC-4 and Cu-Ag myconanoparticles, both of them were selected for further investigation of their role as antibacterial, antioxidant and anticancer agents. Antibacterial potential of methanolic sample was determined by disc diffusion method against four bacterial strains (*Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Bacillus subtilis*) at four different concentrations (1, 2, 3 and 4 mg/ml). All the samples showed antibacterial potential. Cu-Ag myconanoparticles also showed remarkable zone of inhibitions against all the bacterial strains. The antioxidant potential of *Inocybe* sp. BRC-4 and Cu-Ag myconanoparticles and all selected mushrooms was determined by using DPPH radical scavenging assay. The antioxidant potential of methanolic sample was determined by using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. Methanolic extract of *Inocybe* sp. BRC-4 showed 88.5% and Cu-Ag myconanoparticles showed 88% antioxidant potential. All testing samples showed remarkable antioxidant potential. The selected testing samples (*Inocybe* sp. BRC-4 and Cu-Ag myconanoparticles) were also investigated for its anticancer potential. The shielding effect of aqueous extract of testing samples was checked against CCl₄ induced hepatotoxicity in Balb C mice. The alteration in enzyme activities of blood plasma was observed as CCl₄ induced hepatotoxicity caused elevation in ALAT, ASAT, ALP, LDH and MDA. When selected testing samples were injected intraperitoneally, it ameliorated the damaging effect caused by CCl₄. Barti Raj Forest, Chagharzai Valley, District Buner, KP, Pakistan proved to be a good fungal diversity spot. The selected mushrooms showed good biological screening properties which could be bench mark in pharmaceuticals as well.