

ABSTRACT

In the present study, Chamney Forest, Swat Valley, KP Pakistan was explored for its fungal flora. During the investigation, four mushrooms belonging to four families were collected, characterized and biologically screened for their antimicrobial, antioxidant and anticancer potential. Mushrooms were characterized on the basis of morpho-anatomical characters. Scanning electron microscopy was also performed for analyzing the details of spore ornamentations. Fourier Transform Infrared spectroscopic analysis analysis of five mushrooms (Tricholomopsis rutilans, Calocera viscosa, Inocybe comis, Cantharellus cibarius) showed the presence of different antioxidant functional groups like alcohols, phenols, carbonyl and halogens. Inocybe sp. and Calocera viscosa species showed diverse range of functional groups viz: O-H, C=C, C-O, C-H, C-F, C-Br and N-H. Resemblance and difference in functional groups also predicted the closeness of species within same genus and among different genera. Inocybe sp. was used for the green mycosynthesis of silver doped Zn myconanoparticles. Different structural characterization of silver doped Zn myconanoparticles i.e., XRD, SEM, UV Vis and FTIR was done. Inocybe sp and Zn myconanoparticles, both of them were selected for further investigation of their role as antibacterial, antioxidant and anticancer agents. Antibacterial potential of total mushroom extract was determined by disc diffusion method against four bacterial strains (Bacillus subtilis, Staphylococcus aureus, Klebsiella pneumonia and Escherichia coli) at four different concentrations (1, 2, 3, 4 mg/ml). All the samples showed good antibacterial potential, however, silver doped Zn myconanoparticles showed remarkable zone of inhibitions against all the bacterial strains. Four species were also selected for investigation of their role as antioxidant and agents. The antioxidant potential of methanolic and chloroform extracts of selected mushrooms was determined by using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. Methanolic extracts showed a remarkable antioxidant potential of 89%.

The anticancer potential of the chosen test samples (Inocybe sp. and Zn myconanoparticles doped with silver) was also examined. In Balb C. mice, the protective effect of testing sample aqueous extract against CCl₄ induced hepatotoxicity was evaluated. The CCl₄ induced hepatotoxicity resulted in an alteration in the blood plasma's enzyme activities, with ALAT, ASAT, ALP, LDH, and MDA levels rising while catalase levels fell. While a decrease in plasma protein level was seen, it also led to an increase in bilirubin content. The damaging effects of CCl₄ were lessened when specific test samples were administered intraperitoneally. The Chamney Forest in Pakistan's Swat Valley has been shown to be a favourable place for fungi variety. Based on morpho-anatomical characteristics, some species appear to be novel to science, while others have only recently been discovered in Pakistan. The chosen mushrooms also demonstrated favourable biological screening characteristics that may serve as benchmarks for medications.