Abstract

The present study deals with the isolation of different fungal strains for antimicrobial compounds production. 94 soil samples were collected from agriculture and hospital associated lands of Punjab, Pakistan. These soil samples were used to isolate 80 fungal isolates which were then subjected to agar plug diffusion assay for determining their antimicrobial activity. Among these, 22 fungal isolates were primarily screened by agar plug diffusion method for antimicrobial compounds production. Fungal isolate IIB-065 exhibited significant antimicrobial activity against *Staphylococcus aureus* and *Escherichia coli* in well diffusion method. This strain was further subjected to 18S rRNA sequencing and was identified as *Aspergillus fumigatus*. The characterization of antimicrobial compounds produced was performed using TLC, HPLC, FTIR and GCMS. These techniques revealed 1,2-Benzenedicarboxylic acid, diisooctyl phthalate, bis(2-ethylhexyl)phthalate, and hexadecanoic acid were present. Optimization of various cultural parameters such as medium, incubation period, temperature, pH, carbon, nitrogen sources and inoculum size was performed in order to obtain maximum antimicrobial compounds production using *A. fumigatus* IIB-065 by submerged fermentation. Maximum antimicrobial compounds production was observed using potato dextrose broth medium having pH 5.5 after 21days of incubation, at 30°C with glucose, yeast extract as carbon and nitrogen source when it was inoculated with 3% spore inoculum of *A. fumigatus* IIB-065. For sensitivity profiling of antimicrobial compounds, crude extract fermentation broth was compared with commercialized antibiotics against the three pathogenic bacterial strains *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* by disc diffusion method. Crude extract from *A. fumigatus* showed maximum 19±0.009mm inhibition zone against *S. aureus*, 17±0.008mm inhibition zone against *E. coli* and 10±0.005mm zone of inhibition against *P. aeruginosa*. From the present study, it was concluded that antimicrobial compounds of *A. fumigatus* possess a significant potential to inhibit the growth of pathogenic bacteria.