Abstract

The rapid urbanization and industrialization produce immense waste, being released into the environment. Besides other type of wastes including textile and petrochemicals, the pharmaceutical wastewater containing antibiotics has become a major environmental concern. Despite being the most significant discovery, with an approach to improve human and veterinary health standards, antibiotic pollution largely affects people as they are released partially treated and untreated into the environment, making its remediation a challenging task. Conventional methods as physiochemical methods do remove the antibiotics from wastewater, but they employ expensive machinery. Hence, a simple and cost-effective method to degrade antibiotics is bioremediation. Laccases are the super-engines for the degradation of a wide variety of toxic micro pollutants including antibiotics. These are multicopper oxidases targeting a range of substrates. In the present study, we isolated and identified laccase-positive bacterial strains for the degradation of antibiotics cefixime, cephradine and kanamycin sulfate. Guaiacol and ABTS were used as inducers for laccase production. Two strains, *Brevundimonas vancanneytii* (BVP) and BVR2 were identified as laccase positive strains. Maximum laccase production was achieved at 37ₒC after 96-120 hours of incubation. Recent studies reveal that the bacteria resistant to an antibiotic, develop the potential to degrade that antibiotic. We determined antibiotic resistance and Minimum Inhibitory Concentrations (MIC) for the selected bacterial strains by broth dilution and well diffusion method. The antibiotic concentrations to which the bacterium was resistant, just preceding the MIC, was degraded by the respective strain. The strains were cultured with 1% inoculum of pure culture and guaiacol along with copper sulphate for 24 hours at 37ₒC and 120rpm, followed by the addition of resistant concentration of antibiotics and incubation for 72 hours at 37ₒC.The UV analysis revealed that *Brevundimonas vancanneytii* (BVP) degraded 2.5ug/ml (MIC of 5ug/ml), 12ug/ml(MIC of 15 ug/ml) and 50 ug/ml(MIC of 60 ug/ml) of cephradine, cefixime and kanamycin sulfate respectively within 72 hours. The UV analysis for the strain BVR2 demonstrated the degradation of 5ug/ml (MIC of 10ug/ml), 25ug/ml (MIC of 30ug/ml), and 60ug/ml (MIC of 70ug/ml) of cephradine, cefixime and kanamycin sulfate respectively, within 72 hours.