

ABSTRACT

Sixteen heavy metals resistant bacterial strains isolated from industrial waste waters of district Lahore and suburbs were found to be tolerant to multiple heavy metals like Cr, Ni, Pb, As, Cu and Hg on agar media. Optimum growth temperature and pH for most of these strains were 30 °C and 6.5. These bacterial strains were found to reduce 60-88% of different metals from culture media after 72 hours while performing 20.2-40.1% metal accumulation for different metals after same hours of inoculation. Scanning electron microscopy revealed signs of metals adsorption at bacterial cell surfaces. SDS-PAGE also indicated enhanced expression of low molecular weight proteins (Metallothionein) after treatment of bacterial cells with heavy metals in solution. Generally higher resistance was found against Pb, Ni and As in the identified bacterial strains like *Klebsiella* sp., *Staplococcus* sp., *Pseudomonas aeruginosa* and *Bacillus licheniformis*. All of these strains were found to have plasmid while most of these had chromosome based metal resistance except *Pseudomonas aeruginosa* and *E.coli* that were found to have plasmid based resistance for chromium. Copper resistance gene *CueR* was detected in copper resistant bacterial strain *Klebsiella Sp.* which was also found to be positive for mercury resistance gene (*merA*) and arsenic resistant gene (*arsC*). *merA* was also found to be present in *Staplococcus* sp.. In addition to *Klebsiella* sp. *arsC* gene was also detected in *Pseudomonas aeruginosa* and *Bacillus thuringiensis*. Isolation of these genes and their further characterization can be helpful in designing of an efficient heavy metals detoxification strategy. In the light of above observations present study can be helpful for efficient exploitation of bacterial strains for the purpose of biological waste water treatment.