

Detection of plasmids in heavy metal resistance bacteria isolated from the Persian Gulf and enclosed industrial areas.

Abstract

Several heavy metal resistant bacterial strains were isolated from sediment and water samples collected from the Persian Gulf and enclosed industrial areas. All the isolated bacteria were identified by 16S rRNA gene sequencing. Isolated bacteria were tested for the presence of plasmids using the modified alkaline lysate method. The method was effective for identification and characterization of plasmids of different sizes without the use of highly toxic chemicals. The study revealed that the frequency of the occurrence of plasmids in heavy metal resistant bacteria was more than that in the common bacteria. The study also demonstrated that about 66% of isolated bacteria carried large (38-62kb) and/or small sized (4- >2 kb) plasmids. The highest plasmid incidence (84.6%) was detected from industrial wastewater bacteria. A slightly higher incidence of plasmids occurred in bacteria isolated from marine sediments (55.5%) compared to that of the marine water (53.8%). The findings suggested that plasmids are highly ubiquitous and predominant in most heavy metal resistant bacteria. Removal of lead and cadmium from solution by some of these bacteria was very efficient, approximately 120 mg/g dry weight as high as 90%. The isolates tested, presented distinct uptake capacities and the best results were obtained for *Delftia tsuruhatensis* and *Pseudomonas* AU3411 respectively.

Keyword: Coastal zone; Persian Gulf; Industrial areas; Plasmid; Heavy metal resistance bacteria.