

## **Identification of genes encoding heavy metal transporting proteins in selected bacteria of an effluent**

Chathurika K.P.R., Kumari W.M.N.H. and Wijayarathna C.D.\*

*Department of Chemistry, University of Colombo, Colombo, Sri Lanka*

Characterizing microbial genes that encode proteins involved in heavy metal tolerance is useful for bioremediation. The genes *czcD* and *zntA* (948 bp and 2448bp) encode proteins reported to be involved in transporting heavy metals from cytoplasm to periplasm in bacteria. In this study, extracted genomic DNA of strains of *Staphylococcus epidermidis* (O5, O6, O7, O8, O9, O10, D7), *Staphylococcus warneri* (G, Ow) and *Aeromonas jandaei* (O3), isolated from an industrial effluent in Sri Lanka, were used to amplify partial *czcD* and *zntA* genes by polymerase chain reactions (PCR). Three different primer sets were designed for the amplification of *czcD* gene of *S. epidermidis* and *S. warneri* and *zntA* gene of *A. jandaei*. Genomic DNA was isolated using a modified guanidium thiocyanate method. In PCR, a fragment of 672 bp was obtained for all strains of *S. epidermidis* except strain D7, at an annealing temperature of 54 °C and a fragment of 794 bp was obtained for Ow strain of *S. warneri* at an annealing temperature of 53 °C. In analysis through Bioedit software, amino acid sequences of amplified fragments were 100% similar to amino acid sequence encoded by partial *czcD* genes of *S. epidermidis* (Accession Number: NC\_004461) and *S. warneri* (Accession Number: NC\_020164) respectively. A fragment of 647 bp was obtained for PCR that carried out for O3 strain of *A. jandaei* at an annealing temperature of 57 °C. Amino acid sequence of the amplified fragment showed 98% identity to Zn, Cd, Hg and Pb transporting ATPase protein in *A. jandaei* in BLAST search compared to the ZntA. Presence of *czcD* gene in *Staphylococcus* sp. and Zn, Cd, Hg, Pb transporting ATPase gene in *Aeromonas* sp. were confirmed.

**Keywords:** *Bioremediation, Staphylococcus, Aeromonas, czcD, zntA*

\*Corresponding author: [dilruksh@chem.cmb.ac.lk](mailto:dilruksh@chem.cmb.ac.lk)