ABSTRACT

Arsenic is one the heavy metal found in nature that is toxic for most of the living organisms especially humans. Arsenic is poisonous for almost all life forms. As a result of this, arsenic must not be present in under water tables or waste water. Arsenic is found to cause serious health issues in mammals including cancer. So a need for its removal from the industrial waste water is required to stop it from becoming a part of the natural ecosystem related to animal or human consumption. For this purpose, it is found that few bacterial cells have the ability to survive in high heavy metal concentration. This is due to the presence of specific gene in their DNA. Similar property is exhibited by *Thermus aquaticus,* arsenic reductase gene is present in the genome of *Thermus aquaticus*. which was checked from the whole genome sequence of this species present at NCBI (a database). Designing specific primers for arsenic reductase gene and amplifying this gene in a thermocycler is followed by the cutting of this specific DNA fragment by the restriction enzyme whose restriction site was added in the primer designed. After selecting an appropriate vector, in this case pTZ57R/T vector was used. Preparation of competent cells of *E. coli* DH5α and their incubation with the vector was done to produce clones of bacterial cells that possess the desired DNA fragment. The positive control was selected, that is the white colonies. These are those *E.coli* cells that possess the arsenic reductase gene from *Anoxybacillus* sp. These *E.coli* cells can now be used for the treatment of industrial waste water and hence bioremediation.