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Isolation and characterization of Arsenic-resistant bacteria from different water sources of Patna region and possible application in bioremediation

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Abstract : *Arsenic is an ubiquitous metalloid found in hydrosphere, lithosphere and atmosphere. Arsenic contamination in groundwater is a widespread problem in many developing countries including Bangladesh & India. Many innovative techniques have been employed for the removal of arsenic from different sources. Many microorganisms have been found resistant to arsenic which helps them to survive in extreme environment. Several studies showed the presence of arsenic resistant bacteria and their resistance capacity in different water sources. These strains were isolated from different water sources like Ganga, sewage and tube well water respectively from different regions of Patna, Bihar; India which can tolerate arsenite even upto 4mM of the arsenic concentration. From cultural, cellular and biochemical analysis, these isolates showed similarity with of Corynebacterium, Pseudomonas and Streptococcous species respectively. In the present study, we have explored different bacterial isolates and out of them one was rod shaped, gram positive bacteria; one rod shaped, gram negative bacteria and one cocci shaped, gram positive bacteria. The isolates from Ganga, sewage & tube well can oxidise arsenite to its less toxic form arsenate so, these arsenic resistant bacteria can be used in bioremediation of arsenic. The MIC values for Ganga isolates was 2mM and that from tube well was 4mM but sewage isolates showed intermediate MIC of 1.5mM. These isolates were able to convert arsenite into its less toxic form arsenate.*

Keywords: *arsenite, arsenic resistant bacteria, corynebacterium, Pseudomonas, Streptococcous.*

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Introduction :

Arsenic is the most toxic metal and it is widely distributed due to natural and anthropogenic activity in the environment. It occurs in four oxidation states in which the most toxic ones are arsenate (AsV) and arsenite (AsIII). Among these two, arsenite (AsIII) is more toxic than arsenate (AsV) (Obinaju B.E. 2009). Arsenic mostly contaminates drinking water and food products which are consumed by humans and animals. Arsenic species get deposited in skin, lungs, kidney and liver etc. and cause several diseases like