



## ISOLATION AND IDENTIFICATION OF AN ARSENIC ASSIMILATING BACTERIA

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One hundred and one bacterial and fungal strains were isolated from 31 soil and 13 water samples of different arsenic contaminated areas in Jessore district, Bangladesh by using standard isolation procedures (Ahmad *et al.*, 1997). Organisms were stored, preserved and maintained in different culture media and the interaction of these microorganisms with arsenic contaminated water was studied. Isolated microorganisms were coded as strain S-1 to S-101. Comparative efficiency of isolated microorganisms regarding arsenic removal is shown in the Fig. 1 through 5.

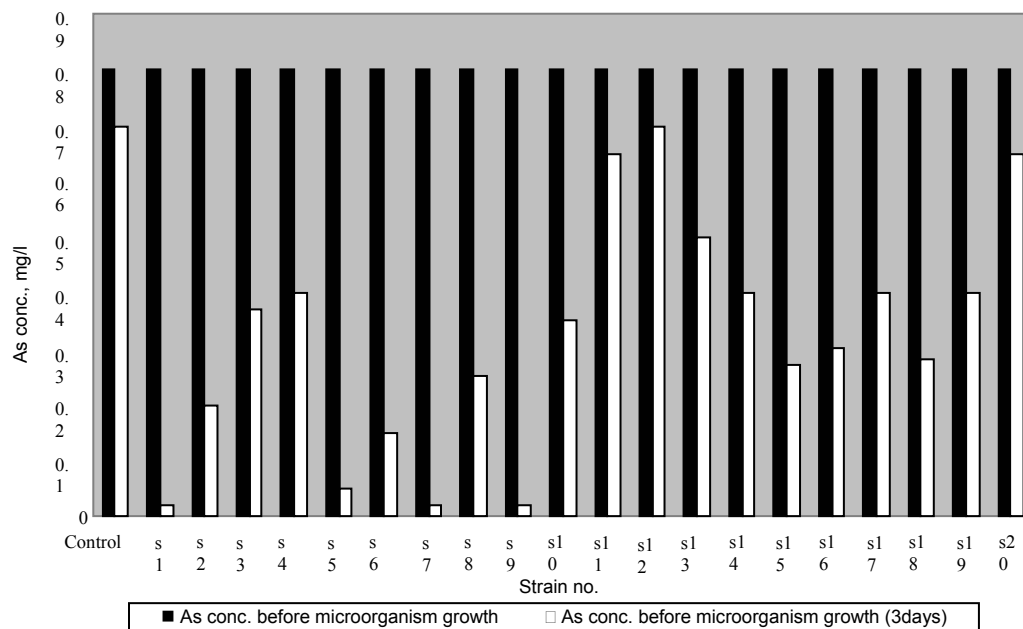


Fig.1. Arsenic removing capability of strain 1 to strain 20.

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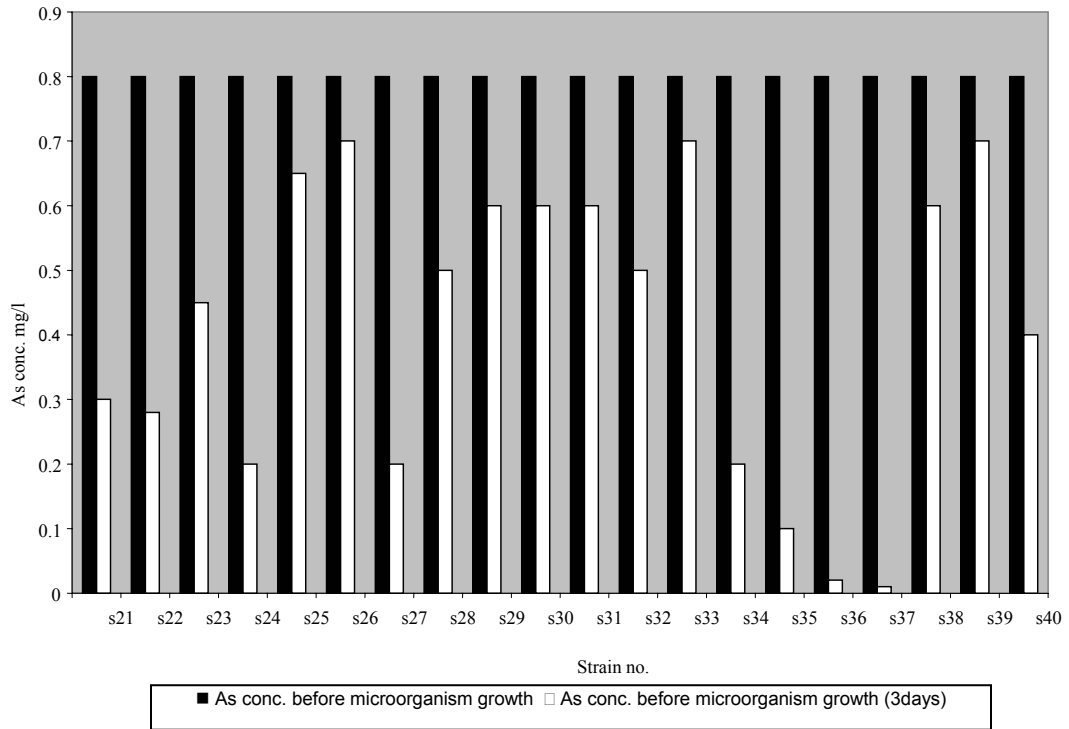


Fig.2. Arsenic removing capability of strain 21 to strain 40.

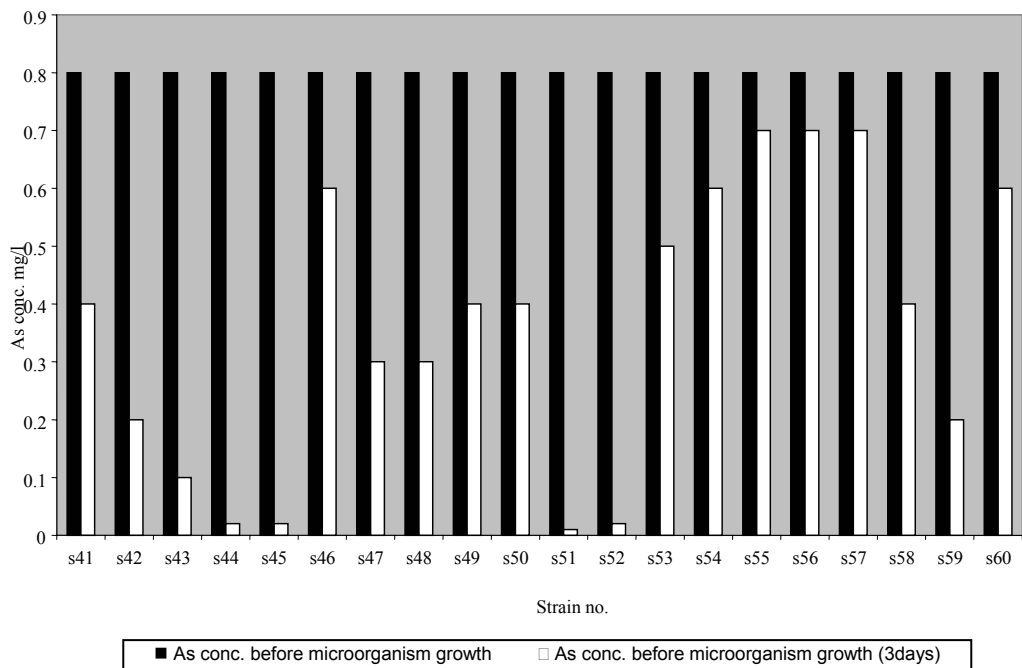


Fig. 3. Arsenic removing capability of strain 41 to strain 60.

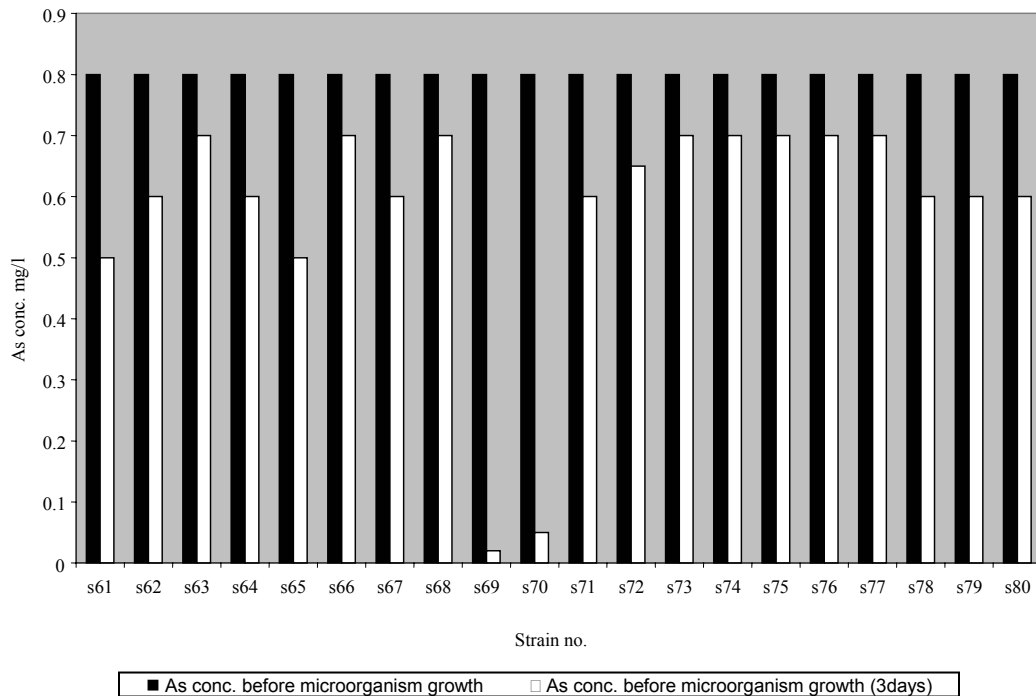


Fig. 4. Arsenic removing capability of strain 61 to strain 80.

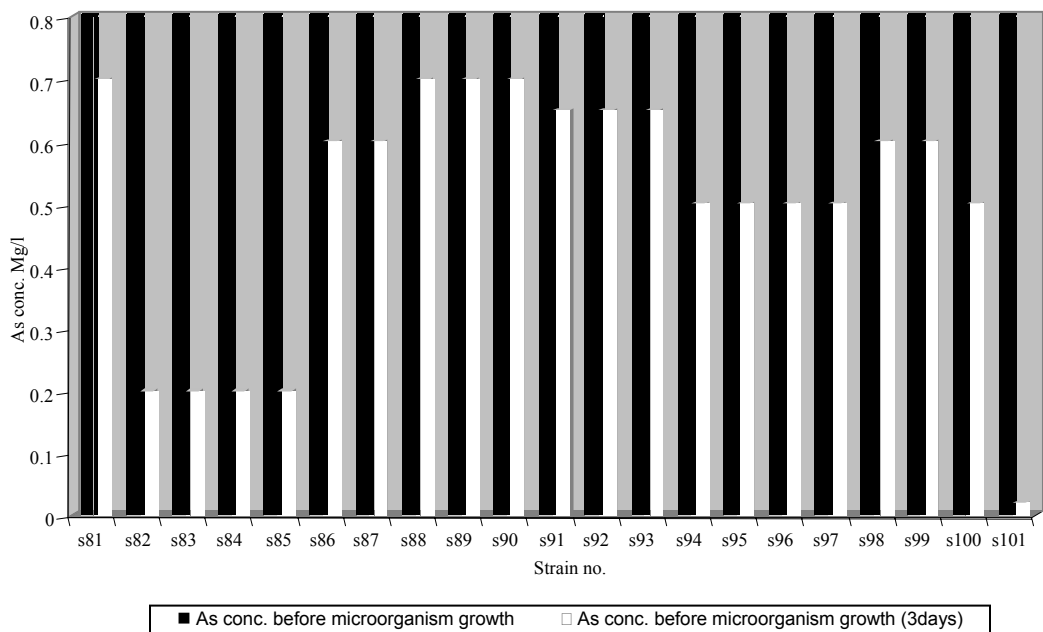


Fig. 5. Arsenic removing capability of strain 81 to strain 101.

It is evident from the above figures 1 to 5 that some of the microorganisms showed considerable efficiency in removing arsenic and some exhibited lesser efficiency while comparing with control. Among the isolated strains, strain S-51 was selected for characterization due to its ability to reduce arsenic from the initial level  $0.8 \text{ mg l}^{-1}$  to  $0.01 \text{ mg l}^{-1}$  which was less than normal, recommended for Bangladesh standard for arsenic ( $0.05 \text{ mg l}^{-1}$ ) (Anon, 1999). Cultural, morphological and biochemical characteristics of the strain S-51 was studied carefully according to the laboratory methods in microbiology and methods described by Buchannan and Gibbons (1974). Gram staining, pigment production test of on nutrient agar, glucose utilization test, catalase test, oxidase test, Kligler's Iron Agar (KIA) and Motility Indole Urea (MIU) test were performed to investigate the biochemical characteristics of selected strains.

After the characterization of the strains, the isolates were identified by following the relevant literature (Buchannon and Gibbons, 1974; Kreig *et al.*, 1984; Burgey's manual of systematic bacteriology, 1984).

The isolation of hundreds of microorganisms, their growth in known arsenic containing broth and the subsequent arsenic measurement gave indication of the presence of only a few arsenic removing microorganisms in spite of the presence of several arsenic resistant microorganisms in environment. These arsenic removing microorganisms are capable of using arsenic, as catalyst in food metabolism (Byron, 2003).

The strain S-51 showed circular shape colony, off white color, irregular margin, convex surface, growth on surface, rod shape features while observed under light microscope (Zeiss Axiolab microscope with cp acromat objectives  $5\times/0.1$ ,  $10\times/0.25$ ,  $40\times/0.65$  and  $100\times/1.25$  oil). It has been found that strain S-51 is a gram negative bacteria, oxidizes glucose to gluconic acid, 2-keto gluconic acid or other intermediates. It also showed catalase and oxidase activities. This characterization give rise to the assumption that S-51 is a *Pseudomonas sp.* which is further confirmed by the comparative study with standard *Pseudomonas aeruginosa* by Kligler's Iron Agar and Motility Indole Urea tests. Further studies are needed for detail characterization of isolated S-51 bacterium.

### Acknowledgement

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