Heavy metals resistance pattern of moderately halophytic bacteria

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ABSTRACT

Beside extremely halophilic archaea, moderately halophilic bacteria are considered to be one of the most important groups of microorganisms adapted to live in hypresaline environments. Moderately halophilic bacteria are defined as those microorganisms with optimal growth in media containing 0.5 to 2.5 M NaCl. Twenty two strains of moderately halophilic bacteria were screened for their heavy metal resistant patterns. A strain that showed the highest levels of heavy metal tolerance was selected based on the cumulative levels of sensitivity. Different minimal inhibitory concentrations of metals were determined for this strain and it was shown to be highly resistante to Ni. Cd and Cu ions showed the highest toxic effect on the strain when combined in non-toxic levels with Ni. Analysis of the intercellular metal contents using atomic absorption spectroscopy revealed the ability of the strain to accumulate Ni ions inside the cell. The gene coding for the 16S rDNA was amplified by polymerase chain reaction using gene specific primers and the PCR product was purified and sequenced. Sequence analysis was done using computer based search through Blast program and the database at the National Institute of Health (USA) and the strain was identified as Staphylococcus sp.

Key words: *Heavy metales, resistance, halophilic bacteria.*

INTRODUCTION

Contamination of the environment by heavy metals is a consequence of technological and industrial processes (Nathalie *et al.*, 2002; Nriagu and Pacyan, 1988; Nriagu, 1996). This has led to the increasing concern about the effects of toxic metals as environmental contaminants. The presence of these contaminants in aquatic environments is known to cause severe damage to aquatic life beside the fact that these metals kill microorganisms during biological treatment of wastewater with consequent delay of the process of water purification. Toxicity of heavy metals to microorganisms is well documented (Nies, 1999; Ehrlich, 1997; Lester *et al.*, 1979).

Moderately halophilic bacteria are one of the most important groups of bacteria that could tolerate high salt concentration. Kushner (1985) defined the moderately halophilic bacteria that could grow in optimum growth with 0.5 to 2.5 M NaCl. Very little attention