

عنوان مقاله:

Isolation and characterization of mercuric reductase by newly isolated halophilic bacterium, *Bacillus firmus* MN8

محل انتشار:

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خلاصه مقاله:

The current study was aimed at isolating and identifying the halophilic and halotolerant bacteria which can produce mercuric reductase in Gavkhuni wetland in Iran. Moreover, tracking and sequencing merA gene and kinetic properties of mercuric reductase in the selected strain were performed in this study. Soil samples were taken from Gavkhuni wetland and cultured in nutrient agar medium with 5% NaCl. To examine the tolerance of purified colonies to mercury, agar dilution method was administered. Similarly, the phylogenetic analysis based on 16SrRNA gene sequencing was conducted. To investigate enzyme activity of kinetic parameters, a spectrophotometer was used to measure the NADPH oxidation decrease at 340 n.m. The results showed that among the 21 halophilic and halotolerant strains isolated from Gavkhuni wetland, 4 were resistant to mercuric chloride. A strain designated MN8 was selected for further studies because it showed the highest resistance to mercury. According to phylogenetic sequencing of 16S rRNA gene and phenotypic characteristics, the strain was categorized in the *Bacillus* genus and nearly related to *Bacillus firmus*. This strain had merA gene. The mercuric reductase showed Vmax and Km values of 0.106 U/mg and 24.051 μ M, respectively. Evaluation of different concentrations of NaCl at 37°C and pH=7.5 in mercuric reductase enzyme activity indicated that the enzyme shows 50% activity in concentration of 1.5 M. Optimum pH and temperature of enzyme activity were 7.5 and 35 °C, respectively. The results suggested that MN8 strain could be a proper candidate for bioremediation of mercury-contaminated environments such as industrial wastewaters.

کلمات کلیدی:

(Halophilic bacteria; merA gene; Mercuric reductase enzyme; Mercury; Polymerase chain reaction (PCR)

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