

ISOLATION OF IRON AND SULFUR OXIDIZING BACTERIA RESISTANT TO ZINC AND COPPER FROM REFINERY SOIL

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INTRODUCTION

Heavy metals are widespread pollutants used in various industries from which effluents are consequently discharged into the environment. They are non degradable compounds with a major threat to human health. Bioremediation is a cost-effective, safe and reliable method for removal of such pollutants from environment. Thiobacillus ferrooxidans is one of bacteria used for this purpose. The aim of present study is isolation of iron and sulfur oxidizing bacteria resistant to zinc and copper from polluted soil.

MATERIAL AND METHODS

Polluted soil was collected from Isfahan-Iran refinery then some chemical properties were measured. The total heterotrophic bacteria were also enumerated in soil sample. Isolation of iron and sulfur oxidizing bacteria from soil sample was performed in 9k medium. The streak plate method on 9k, thiosulfate and nutrient agar mediums was used for purification of these bacteria then gram staining was done for primary identification of bacteria. Then, the resistant pattern of isolated bacterium to copper and zinc was determined on 9k medium supplemented with 0.5 to 256 mM of each mentioned heavy metals through Minimum Inhibitory Concentration (MIC) determination.

RESULTS AND DISCUSSION:

The pH, EC, organic matter and the concentration of zinc and copper in soil sample were 7.14, 3.16 dS/m, 3.6 %, 51 ppm and 45 ppm, respectively. Also the population of heterotrophic bacteria in soil was 2.17×10^5 CFU/g. Selection of iron oxidizing bacteria was done according to appearance of brownish color of medium due to oxidation of ferric to ferrous ion in 9K medium. Production of white precipitate in thiosulfate medium indicated the oxidation of sulfur by this bacterium. It was gram negative rod shaped bacterium, couldn't grow on nutrient agar medium. Based on these results it is probable that selected isolate is Thiobacillus ferrooxidans. This bacterium was able to grow on both zinc and copper concentration up to 256 mM. It can be concluded that some bacteria presented in polluted environment show the ability for removal of heavy metals.

Keywords: Thiobacillus ferrooxidans, Heavy metals, Bioremediation



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