Characterization and bioremediation of groundwater contaminated with nitrate in wetland of Chaohu lake

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The severe eutrophication of Chaohu lake in China was attributed to nitrate from non-point source in the surrounding catchment. The groundwater recharge is one of important sources. However, few attentions are focused on this problem. This study has investigated hydrochemical characteristics and nitrate contamination of groundwater in Nanfei watershed between Chaohu lake and old town of Hefei, China. Based on the hydrochemical survey in the watershed, nitrate pollution of groundwater from 91 samples covering 190 km^2 has been assessed; Denitrifying bacteria from the wetland of Chaohu Lake were sampled and incubated in liquid medium and filled into the bores *in situ* for the bioremediation; Experimental research for nitrate removal in wetland of Chaohu lake has been done. Results show that: (1) The concentration of the nitrate was over the standard value(20 mg/L) seriously in large part of the study area, the rate of samples over the standard value reaches at 47.3%; (2) In the shallow aquifer of wetland near Chaohu lake, the concentrations of the nitrate measured varied from 89.5~220.4 mg/L; (3) After adding to the bacteria incubated, nitrate content is gradually decreased with the time, the maximum efficiency of nitrate removal is up to 57.67%, the ammonia content present a tendency of decreasing at first and then increasing, nitrite content present a tendency of increasing at first and then decreasing; (4) The nitrate content is negative correlation to the pH, and is positive correlation to the DO, further mechanism studies on nitrate bioremediation are suggested.

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Acidophiles distribution related to the geological environment in an Uranium deposit

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Introduction

The acidophiles distributed in the acidic environment of mine have potential to accelerate the dissolution of minerals. As a country with poor resources of uranium ores, high grade reserves of uranium ores has been exhausted in the last 50 years and only left most low grade reserves in China. Bioleaching have been widely thought as a commercial and envrionment friendly technique to recover metals from the low grade ores[1], in which majority of the acidophiles originated from the given minerals are the contributor. The geological envrionment has important effects on the biodiversity of microorganisms, and vice-versa.

Results

About 60 smaples from the 721 Uranium Mine in southern China at different sites and seasons were presented to isolate acidophiles using different selective medium and double layer solid plate [2]. Under the same conditions, different samples had different enrichment durations. The duration of enrichment from liquid samples were shorter than from minerals; the higher the pH and lower the temperature of samples, the less the diversity was; the higher content of pyrite, the easier the sulfur oxidized bacteria were isolated. As a result, 5 species bacteria (*Acidibacillus ferrooxidans, Leptospirillum sp., Sulfobacillus sp., Acidibacillus thiooxidans and Acidiphillum sp.)* and 1 species fungus (*Acidomyces richmondensis*) of culture were isotated and identified by colonies and 16s rRNA gene amplication methods. It indicated that there were close interrelationship between the distribution of acidophiles and geological environment.

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