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Studies on biological denitrification using sequencing batch reactor

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Nitrate pollution is caused through the introduction of excessive amount of nitrates in to surface and ground water mainly as a result of agricultural activities, human wastes or industrial pollution. Many industries such as nuclear industry, food processing, fertilizers, alcohol and metallurgy generates effluents with high concentration of nitrates. Nitrates are soluble in water and nitrate polluted water causes serious environmental and health issues. This study investigates the nitrate removal by heterotrophic denitrification process in Sequencing Batch Reactor (SBR). This process has been chosen because of its simplicity and higher efficiency for denitrification of wastewater. A facultative microorganism was isolated from NITK hostel septic tank waste water and screened under aerobic as well as anoxic conditions. To isolate a facultative bacterium from the sample, primary screening was done after enriching the

culture. Further screening was done to identify a efficient denitrifying bacteria. The efficient bacterial strain (S26) was identified as *Bacillus pumilus* by 16S rRNA genome sequencing method. The effect of various parameters influencing denitrification by *Bacillus pumilus* was studied. As a result, denitrification could be obtained at PH 7-7.5, incubation temperature of 35- 40°C with carbon source as acetate. Kinetics studies for denitrification were conducted and biomass yield at different nitrate concentrations were experimented and maximum specific growth rate of 0.074/h was observed during the 6th hour of exponential phase. In future bionitrification experiments to be conducted in Sequencing Batch Reactor to study the effect of influent nitrate concentration and effect of carrier loading.

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