
A NEWLY ISOLATED AEROBIC BACTERIAL STRAIN (*Paenebacillus polymyxa*) TOWARDS REMEDIATION OF NITRATE POLLUTION OF WATER

A. Thurairajah^{1,2*}, N. Gnanavelrajah¹, R.R. Ratnayake²

¹*Faculty of Agriculture, University of Jaffna, Sri Lanka*

²*National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka*

**Corresponding author (email: abhiramy@univ.jfn.ac.lk)*

Introduction

Nitrate contamination of ground water has become a serious issue all over the world. Excessive consumption of nitrate can cause health effect to human and animals; specially associated to methemoglobinemia (blue baby syndrome) in infants and gastrointestinal cancer in adults (Ren et al., 2018). Bacterial denitrification is being considered to be the promising approach for reducing nitrate from contaminated water. Biological denitrification is the anaerobic processes of reduction of oxidized nitrogen compounds through the sequential activity of microbial reductase enzymes to gaseous nitrogen. Four enzymes, such as nitrate reductase, nitrite reductase, nitric oxide reductase and nitrous oxide reductase are responsible for complete reduction of nitrate ion to di nitrogen gas. There are varieties of incomplete denitrification pathways also exist: Few denitrifying bacteria reduce both nitrate and nitrite; others reduce only nitrite, Few produce only dinitrogen; others produce a mixture of dinitrogen and nitrous oxide; others produce only nitrous oxide (Carlson and Ingraham, 1983). Biological denitrification is the most important and widely used method to treat nitrate wastes as it enables the conversion of nitrogen compounds in to harmless di nitrogen gas. Although nitrate reduction activity is exhibited by diversity of microbial genera, with a range of heterotrophic and autotrophic metabolism, the aerobic nitrate reducers belongs to a very restricted group. Aerobic denitrification is attracted a lots of attention due to its easier operation and higher nitrate reduction efficiency than anaerobic denitrification (Wu et al., 2013). Most predominant denitrifying bacteria in our environment which has been frequently reported belongs to the genus *Pseudomonas*. There are reports on aerobic denitrifying species isolated from environmental samples such as; ponds, canals, soils and activated sludge (Wu et al., 2013). Consequently, the aim of this study was to investigate the efficiency of bacteriological removal of nitrate from nitrate rich medium and water by newly isolated strain in laboratory condition. The effect of two carbon sources glucose and starch in three different percentages were investigated using mineral salt medium containing KNO₃ to select the most effective carbon source.