

## **ASSESSMENT OF POTENTIAL REMOVAL OF NITRATE FROM SYNTHETIC MEDIUM BY SELECTED HETEROTROPHIC BACTERIA – AN APPROACH FOR REDUCING NITRATE IN GROUNDWATER OF JAFFNA PENINSULA**

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### **Introduction**

The removal of nitrate in groundwater is of great interest because excessive nitrate in groundwater and surface water is a growing problem worldwide including Sri Lanka, mainly due to excessive application of fertilizers. The World Health Organization has set a limit of 11 mg/l  $\text{NO}_3^-$  - N for human consumption. Consumption of excess nitrates can have several detrimental health effects such as methaemoglobinemia, stomach cancer and adverse reproductive outcomes [2]. Groundwater is the major natural water resource in the Jaffna Peninsula, Sri Lanka, where, population is entirely dependent on the groundwater resources for all the purposes [3]. The water samples in wells where there is agricultural activity have  $\text{NO}_3^-$  - N levels between 20 to 50 mg/l [4]. Though nitrate contamination of ground water has been reported in Sri Lanka, there has been little research reported on remediation of such pollution except few phytoremediation studies [5]. Thus it is necessary to remove nitrate from groundwater resources to reduce its harm to the environment. Nitrate from the contaminated water can be removed by ion exchange, reverse osmosis, electro dialysis and some other chemical treatments. The most promising and versatile approach being studied is biological denitrification. Biological denitrification is highly selective and efficiency of the process is very high and can reach nearly 100%, which is not matched by any other methods available for nitrate reduction. Since most of the nitrate reducing bacteria are heterotrophs, source of organic carbon is an important component of the denitrification process. Usually, dissolved carbon sources, such as ethanol, methanol, acetate or glucose, are used as electron donor for nitrate reduction. The aim of the present study is to identify the applicability of five selected bacterial strains for nitrate removal in synthetic medium. The best five strains were selected based on the efficiency of nitrate removal (>50%) from nutrient broth. They were assessed for potential of reducing nitrate content in synthetic medium with glucose as a carbon source and control.