

UNIVERSITI TEKNOLOGI MARA

**ISOLATION AND
CHARACTERIZATION OF
BACTERIAL COMMUNITY
FROM LAKE WATER
FOR MANGANESE
REMOVAL**

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ABSTRACT

Water scarcity was the result of imbalance natural phenomena across the world with the combination of the irresponsible act of human towards our beautiful Earth. Most of the water supply can be obtained on the surface water. However, it is depending on the geological population where some will be obtained from groundwater. However, due to many factors largely contributed from human being, water reservoir contaminated with harmful compound especially manganese. Divalent soluble manganese can be catalysed to insoluble manganese oxide by using bacteria known as manganese oxidizing bacteria (MOB). The MOB is phylogenetically diverse and can be isolated from various sources like ocean, basalt and many more. Hence, this study will be focusing on isolation and characterization of pure culture originated from surface lake water. The pure isolation technique will be conducted to isolate the community to its single colony. The single colony next will be characterized by mostly its biological character. After being isolated, Gram Staining Test will be used to characterize the isolated bacteria based on its cell wall constituents and will be observed by using microscope. The gram-positive bacteria will have violet colour and pink for gram-negative bacteria under the microscope observation. The manganese tolerance test then conducted to test the ability of the bacteria to grow in the presence of manganese at various concentration. The number of colonies formed plotted into a graph versus manganese concentration after one day incubation period. The kinetic Growth Curve plotted within 24 hours growing in the incubator.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Water crisis seems to be emerging nowadays as a menace to human security because of these factors; depletion of ground water due to the imbalance natural phenomena such as volcano eruption and the deterioration of the environment due to irresponsible human activities that cause pollution of the water sources. 68% of freshwater is found in glaciers and icecaps while only 32% found in ground water. However, only 0.3% is useable for drinking water that is in the main water stream such as river, lakes and swamps. While the remaining 99.7% requires extensive treatment as it is in the form of salt water from the ocean (Mohan et al., 2012).

There are many ways to overcome the drinking water supplied issues. One of it is the desalination of ocean water. The ocean water can be desalinated however it requires high cost Besides that, the desalination technology uses thermal distillation method that is not environmentally friendly and contribute to the climate changes. Based on the thermal distillation method, the sea water will be boiled to produce steam, named as purified water vapour. The water vapour then will be cooled back and when it condenses, it will return back as water that can be used. But, excessive and concentrated salt used changes the pH in the seawater if it returned back to the sea and chemical used become waste disposal problem (Zhao et al., 2019).

Besides desalination of sea water, the Fog Catcher Technology introduced as one of the technologies that can be used for people that live in the dry area. The idea is to turn the fog into drinking water. The small particle of fog with diameter ranging from 5 to 50 micrometre will gather on the mesh and merge as water droplets. But the problem occurs when a larger water droplet that resulted from the rainfall driven by wind causing them to be collected together and become inseparable. In addition to that, the media to filter the fog limited due to the unsystematic comparisons of different mesh synthetic textile (Regalado & Ritter, 2016).