UNIVERSITI TEKNOLOGI MARA

STUDY OF TEMPERATURE INDUCTION TO *PSEUDOMONAS AERUGINOSA* GROWTH AND MORPHOLOGY, THE KINETICS APPROACH USING BPA MEDIUM

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ABSTRACT

Environmental pollution is getting worse day by day without no promising solution to control it. Although there are various methods available, microbial degradation pathway looks promising thus more studies needs to be done on it. $P.$aeruginosa ability to degrades BPA has been studied before and this study is focusing on temperature which this species works best. In this report, the temperature effect on $P.aeruginosa$ was studied along with its kinetic in order to find the best temperature that gives the highest degradation of BPA. Temperature parameter was controlled at 30, 40, 50°C. The results show us that this species is a gram-negative monoflagellated bacterium which release pyocyanin pigment, it was able to degrade 72% of BPA from its initial concentration of 4ppm in 24 hours with the rate of 8.42×10^{-9} g/s.

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CHAPTER 1

INTRODUCTION

1.1   RESEARCH BACKGROUND

There are various types of organic pollutants that are released into the environment which have caused pathological effects in the living system. Endocrine Disruptor Chemicals (EDCs) is referred to the chemical which has been proved to cause cancer, harming the reproductive system of male and female, obesity and cardiovascular diseases.

From the EDCs, the major chemical that is released into the environment is Bisphenol A (BPA) as the BPA production is one of the highest with approximately three million tons (Mita et al., 2015). Place that are most damaged is heavily populated areas or industrial sites as its surface and water system are contaminated which then causes problem to the public. There are several methods that have been developed to fight off this problem such as photodegradation, oxidation and biodegradation. From all of those methods, biodegradation looks more promising as it selectively reduces the concentration of the targeted compound while it remains unchanged. For biodegradation, there have been several methods which are by using crude enzymes either free or immobilized, and microorganism which are in suspension or as biofilm.

Pseudomonas aeruginosa (*P. aeruginosa*) is a gram-negative microbe with robust metabolic diversity. It can grow BPA as the sole carbon source where most microorganism cannot. *P. aeruginosa* pathogenic ability causing it to be one of the species that commonly caused community-acquired or hospital-acquired infections which may if chronic may lead to life threatening (LaBauve & Wargo, 2012). This aerobic rod bacteria can be found living freely commonly in soil and water, it measures 0.5 to 0.8μm by 1.5 to 3.0 μm. This species is motile with the presence of single polar flagellum. *P. aeruginosa* can use more than 75 organic compounds for growth thus proving its metabolic versatility, it optimum temperature for growth is 37°C and can withstand temperature up to 42°C. (Todar, 2013). *Pseudomonas sp.* have the ability to degrade phenol to become its carbon substrate for the