# UNIVERSITI TEKNOLOGI MARA

# STUDY OF TEMPERATURES AND CONCENTRATIONS ON FAST BIODEGRADATION OF TOXIC BPA BY *PSEUDOMONAS AERUGINOSA* NR. 22 ISOLATED FROM MALAYSIAN POND

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#### ABSTRACT

There are more attentions have been focused on environmentally friendly ways on how to solve some of arises problem due to the globally increase in water pollution and aquatic imbalance. There is also incremental in public awareness regarding on this problem. One of the techniques is the use of microorganisms and their aggregates and the biodegradation methods for the treatment of phenol contaminated wastewater are more effective and less costly. Phenolic compound regarding on the pollution, it is one hazardous pollutant that is toxically relative at low concentration which the accumulation of the phenol creates toxicity at both flora and fauna. Bisphenol A is one of the most common toxic environmental pollutants that originate mainly from industrial processes and there is need to decontaminate. The objectives of this work are to study the effect of two variables which are the temperature (30°C, 35°C, 40°C, 45°C, 50°C, 55°C and 60°C) and the concentrations (100ppm, 150ppm, 200ppm, 250ppm, 300ppm, 350ppm and 400ppm) as to identify the significant effects and interactions in the batch studies. This is because it was found that temperature and concentration significantly affecting the degrading potential of *Pseudomonas aeruginosa* on the toxic BPA. The optimum conditions of the variables for the growth of Pseudomonas aeruginosa and for maximum biodegradation of bisphenol A are at the temperature of 30°C and with the concentration of 100ppm based from the result obtained. These results are useful as to understand the physiological and biochemical properties of Pseudomonas aeruginosa before its optimum use in environmental application and these datas will assist in choosing the right bisphenol A degrader for a changeable environment.

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### **CHAPTER 1**

## INTRODUCTION

#### 1.1 RESEARCH BACKGROUND

Recently, the productions of the variety of compounds occur from the massive increase in the synthesis organic chemicals by human being and some of them are xenobiotic. The xenobiotic structures are not easily recognized by the existing degradative enzymes which best describes as xenobiotic characters; hence they accumulate in the environment as a result. Longrange transportation capability, human and animal tissue bioaccumulation and food chain bio magnifications as they persist into the environment. Phenol and its higher homology are aromatic molecules containing hydroxyl group attached to the benzene ring structure which its origin in the environment is both natural and industrial. Forest fire, natural run off from urban area where asphalt is used as the binding material and natural decay of lignocellulosic material are the example of the natural sources, meanwhile the oil refineries, chemical, petrochemical, pharmaceutical, metallurgical, pesticide products, paint and varnish industries, textile, polymer industries, alkylphenols, caprolactums and adipic acid are the example of the industrial sources.

Carbolic odor to receiving water bodies has been impacted by the presence of bisphenol A in the water which can cause toxic effects on aquatic lives even at low concentration. This is because bisphenol A are toxic to human beings which can affect several biochemical functions. Bisphenol A is a major pollutant which is included in the list of Environmental Protection Agency (EPA) where the concentration of phenols in waste waters varies from 100 to 300ppm. This is essential for bisphenol A-containing effluents need to be properly treated before being discharged and efficient treatment methods are required as to lower down the phenol concentration in waste water to acceptable level which is 5 ppm according to Environmental Protection Agency (EPA).