

**ISOLATION OF BISPHENOL A-DEGRADING BACTERIA, *PSEUDOMONAS* SP.
FROM SHAH ALAM SOIL**

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ABSTRACT

Soil is a mixture of minerals, organic matter, gases, liquids and numerous organisms that together support life on Earth. One gram of fertile soil can contain up to one billion bacteria and most of these bacteria are aerobic. In this research project, I have decided to collect three soil samples from three different locations in Shah Alam. The soils then will undergo serial dilution to obtain 10^{-5} of soil solution. This diluted solution then will be streaked on *Pseudomonas* Agar and incubated at 37°C for 24 hours. The purpose of conducting this streaking method on specific agar is because I want to isolate *Pseudomonas* sp.. *Pseudomonas* is a type of Gram-negative bacteria that can degrade BPA via a novel pathway involving oxidative skeletal rearrangement of the BPA. BPA is a highly biotoxic compound that kills many microorganisms at a low concentration. As the pure cultures successfully obtained, a study of a simple fermentation process in shake flask was conducted to see the ability of *Pseudomonas* sp. to degrade BPA at different concentrations; 10ppm, 20ppm, 30ppm, 40ppm and 50ppm. Besides that, pure cultures obtained also will undergo morphological study of the colony through Gram Staining process. Based on the results obtained, *Pseudomonas* sp. able to degrade BPA and use it as a source of energy for them to grow. The higher the amount of BPA, the greater the amount of biomass produced. It can be concluded that the research is successfully conducted within the allocated period.

TABLE OF CONTENTS

ACKNOWLEDGEMENT	v
ABSTRACT.....	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
LIST OF ABBREVIATION / NOMENCLATURE.....	xii
CHAPTER 1	1
INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Objectives of Study.....	4
1.4 Scope of Study	5
CHAPTER 2	6
LITERATURE REVIEW	6
2.1 Bisphenol A	6
2.2 Health Effects of Bisphenol A	9
2.3 Factors in Degrading Bisphenol A.....	10
2.3.1 Types of Bacteria	10
2.3.2 Bacterial Counts.....	10
2.3.3 Supply of Oxygen	10
2.3.4 Salt Concentration in Soil	10
2.3.5 Substrate Factor	11
2.4 <i>Pseudomonas</i> sp.....	11
2.4.1 Morphology of <i>Pseudomonas</i>	13
2.4.2 Biodegradation Pathway of BPA by <i>Pseudomonas</i> sp.	13
2.5 Growth of <i>Pseudomonas</i> sp. In BPA degradation	16
2.5.1 The Bacteria Growth Phase.....	17
2.5.2 The Growth Kinetic Model of Bacteria	18
CHAPTER 3	20
METHODOLOGY	20
3.1 Overview of Methodology	20

CHAPTER 1

INTRODUCTION

1.1 Background of Study

In this world, only 5% of what is produced by green plants is consumed by animals and the rest 95% is consumed by microorganisms. One gram of fertile soil can contain up to one billion bacteria, and most of them have not even been discovered yet. Most of these bacteria are aerobic where they need oxygen from the soil atmosphere in order for them to survive. The growth of these bacteria is limited by the food that is available in the soil. Bacteria are so tiny and microscopic where it is almost impossible to see them with naked eyes. Usually, researcher or scientist observed them through microscope. It is a one-celled organisms which have the size of $\frac{4}{100\ 000}$ of an inch wide ($1\mu\text{m}$) and somewhat longer in length. Even though bacteria are very small in size, they makeup in numbers where they usually present in a very large number. A teaspoon of productive and fertile soil generally contains between 100 million and 1 billion bacteria.

Bacteria fall into four functional groups where most of them are decomposers that consume simple carbon compounds, such as root exudates and fresh plant litter besides also degrade carbon source like Bisphenol A. By this process, bacteria convert energy in soil organic matter into forms useful to the rest of the organisms in the soil food web. A number of decomposers can break down pesticides and pollutants in soil. Decomposers are especially important in immobilizing, or retaining, nutrients in their cells, thus preventing the loss of nutrients, such as nitrogen, from the rooting zone. A second group of bacteria are the mutualists that form partnerships with plants. The most well-known of these are the nitrogen-fixing bacteria. Next, the third group of bacteria is the pathogens. Bacterial pathogens include *Xymomonas* and *Erwinia* species, and species of *Agrobacterium* causes gall formation in plants. Lastly, the fourth group, called *lithotrophs* or *chemocautotrophs*, obtains its energy from compounds of nitrogen, sulphur, iron or hydrogen instead of from carbon compounds. Some of these species are important to nitrogen cycling and degradation of pollutants. Interesting fact about the bacteria in soil is that most of the bacteria found in soil are heterotrophic and form spores. The most abundant species of bacteria in soil are