

**TREATMENT OF BATIK WASTEWATER USING GRANULAR  
PHYSICAL COCONUT BASED ACTIVATED CARBON (GAC)**

By

**TENGGU FAZILAH BINTI TENGGU OSMAN**

Under the supervision of

**Associate Professor Dr. Ku Halim Bin Ku Hamid**

Submitted in partial fulfilment of the requirements for the Bachelor of  
Science (Hons.) in Applied Chemistry

**Faculty of Applied Science  
Universiti Teknologi Mara  
Shah Alam**

**October 2000**

## **ABSTRACT**

### **TREATMENT OF BATIK WASTE WATER USING GRANULAR PHYSICAL COCONUT BASED ACTIVATED CARBON (GAC)**

Activated carbon is the generic term used to describe a family of carbonaceous adsorbents with a highly crystalline form and extensively developed internal pore structure. A wide variety of activated carbon products is available exhibiting markedly different characteristics depending upon the raw material and activation technique used in their production. It is also used as adsorbent to purify, decolourize and remove odour of wastewater. The Total Solid (TS), Suspended Solid ( SS ), Volatile Suspended Solid (VSS), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) are important parameter for determining the water quality. BOD measures the amount of dissolved oxygen required by microorganisms. It is measured at 20° C under 5 days incubation. BOD value represents the carbon available for metabolic activity and indicates the extent of pollution. COD is the oxygen equivalent of the organic contents present in a water sample.

## **ACKNOWLEDGEMENT**

First I would like to express my sincere gratitude to Assoc. Prof. Dr. Ku Halim bin Ku Hamid for giving me opportunity to work with him to complete this thesis, for his valuable guidance, ideas and support throughout the period of this subject.

I also would like to express my thanks to Mrs. Zarila bt. Mohd Shariff, Course Tutor of the Bachelor of Science (Hons.) in Applied Chemistry and other lecturer for giving me support and courage.

Last but not least, my thanks goes to Mr. Ibrahim, my family, friends and colleagues who had provided invaluable insight, support and cooperation.

Thank you.

# TABLE OF CONTENTS

	<b>Page</b>
ABSTRACT	i
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LISTS OF TABLES	vi
LISTS OF FIGURES	vii
CHAPTER	
1. INTRODUCTION	1
2. LITERATURE REVIEW	
2.1. Introduction	4
2.2. Carbonization	5
2.3. Classification of Activated Carbon	6
2.3.1 Powdered Activated Carbon	6
2.3.2 Granular activated Carbon	7
2.4. Porosity	8
2.4.1 Adsorption Properties and the Effect of Porosity	9
2.5. Application of Activated Carbon in Water Treatment	9
2.6. Activated as an Adsorbent	10
2.7. Contaminants From Industry	11
2.8. Batik Wastewater	12
2.8.1 Dyeing	13
2.9. Analysis and Pollution Parameters	15

# CHAPTER 1

## INTRODUCTION

Activated carbon are high porosity, high surface area materials that used in industry for environmental remediation, purification and chemical recovery operations. Activated carbon can be produced from a number of precursor materials including coal, peat, wood, coconut shell and agricultural wastes. These precursors are normally exposed to a number of different activation methods in an effort to achieve a carbon with the best qualities for a particular application (Donnet, 1988).

The term activated carbon in its broadest sense includes a wide range of amorphous carbon-based materials prepared to exhibit a high degree of porosity and an extended interparticulate surface area. These are obtained by partial combustion, combustion and thermal composition of various carbonaceous substances. These materials can be granular or in powdered. The granular form is characterized by a large internal surface and small pores. The finely divided powdered form is associated with larger pore diameters but a smaller internal surface (Bansal et.al,1988)

Activated carbon are excellent adsorbent and thus are used to purify, decolorize, dechlorinated, deodorize, detoxicate, remove or filter or modify the salt, separate and concentrate in order to permit recovery and catalyst support. These application of active carbon are of the interest to most economic sectors. The adsorbent properties of activated carbons are essentially attributed to their large surface area, a high degree of