

**DEVELOPMENT OF PEAT BASE AS COAGULANT AGENT
FOR EMULSIFIED WASTEWATER OF CANON INDUSTRY**

By

NUR FAZLIANA BT. ABDUL RAHMAN

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Universiti Teknologi MARA

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Waste water generated in Canon industrial processes, contain organic compounds which are not easily amenable to chemical or biological treatment. The processing plants utilize a wide variety of coolants (polishing and penta coolant) and other chemicals such as surfactants, detergents, mineral oils, anti-corrosives, antiseptic agents, defoamings, carboxylic acid and alkanol amine which can cause an emulsion problem (oil in water or O/W) and enhance the values of chemical oxygen demand (COD), biochemical oxygen demand (BOD), total organic carbon (TOC) and oil and grease. In order to overcome these problems, a method called "Fixed-Bed Burning System" was developed which was used to produce coagulant agent from local peat [powder activated carbon (PAC)] by carbonisation and activation processes to treat the emulsified wastewater of Canon industry. In this method, the peat was carbonised for 5 hours at 350-440 °C to be peat charcoal. Then the peat charcoal (20.0 grams each) was impregnated with specific concentration of hydrochloric acid (1.0, 1.5, 2.0, 2.5 and 3.0 M) for 30 minutes with the volume of 100.0 ml to adjust it pH and after that it was activated for 8 hours at 600 °C. The impregnated peat (2.0 grams each) was then applied into the 50.0 ml of wastewater sample to determine the best molar for coagulation-flocculation process. From the results, the impregnated peat with 1.5 M indicated as the optimum concentration to get the clearest supernatant. The condition was used to determine either the impregnated peat could act as coagulant or not by varied the weight (3.0, 5.0, 7.0 and 13.0 grams) with 50.0 ml of wastewater sample and undergo the chemical and physical tests such as COD, BOD, absorbance and pH. Polyaluminum chloride (PACl 10 %), non-impregnated peat charcoal and non-impregnated coconut shell charcoal were used as comparison. The best coagulant was impregnated peat charcoal (13.0 grams) due to it lower COD value (6 000 mg/l), BOD value (38.25 mg/l), and pH (2.00).

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TABLE OF CONTENTS

	Page
ABSTRACTS	i
ABSTRAK	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
LIST OF GRAPHS	xi
CHAPTER	
1 INTRODUCTION	1
1.1 Environmental of Quality Act 1974	4
1.2 Canon industry effluent	4
1.3 Objectives of thesis	5
1.4 Significant of thesis	5
2 LITERATURE REVIEW	6
2.1 Raw materials to produce activated carbon	6
2.2 Manufacture of activated carbon	7
2.2.1 Carbonisation	8
2.2.2 Activation	9
2.3 Structure of activated carbon	10
2.4 Classification of activated carbon	11
2.4.1 Powdered activated carbon	11
2.4.2 Granulated activated carbon	12
2.4.3 Spherical activated carbon	12

CHAPTER 1

INTRODUCTION

The basis for the industrial production of activated carbons was established in 1900-1901 in order to replace bone char in the sugar refining process. This active carbon was prepared by carbonising a mixture of materials of vegetable origin in the presence of metal chlorides or by the action of carbon dioxide or steam on charred materials. The manufacture of better quality-gas adsorbent carbons received fresh impetus during World War 1, when they were used in gas masks for protection against poisonous gases. In the late 1930s, the activated carbons were also manufactured from sawdust by chemical activation with zinc chloride, for volatile solvent recovery and for the removal of benzene from tower gas [Bansal et. al, 1988].

Activated carbons is the trade name for a carbonaceous adsorbent which is defined as non-hazardous, processed, carbonaceous products, having a porous structure and a large internal surface area. These are obtained by combustion, partial combustion and thermal decomposition of various carbonaceous substances. These materials can adsorb a wide variety of substances, i.e. they are able to attract molecules to their internal surface and are therefore called “adsorbents”. The volume of pores of the activated carbons is generally greater than 0.2 ml g^{-1} . The internal surface area is generally greater than $400 \text{ m}^2 \text{ g}^{-1}$. The width of the pores range from 0.3 to several thousand nanometer (nm) [Henning K.D, Schafer S “Activated Carbon from Carbon”. <http://www.carbon for environmental protection.htm>].