

**UNIVERSITY TEKNOLOGI MARA**

**PERFORMANCE ANALYSIS OF SUBMERGED  
AERATED BIOFILM (BIOKUBE JUPITER 50)  
SYSTEM IN MUNICIPAL WASTEWATER  
TREATMENT**

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## ABSTRACT

Performance analysis of submerged aerated biofilm (Biokube Jupiter 50) system (SABS) in municipal wastewater treatment was studied. The samples were taken from wastewater treatment plants at Mawar College, UiTM. The study was focused on the characteristic of wastewater treated by the SABS, the efficiency and the effectiveness of the SABS in treating domestic wastewater. A comparative performance study was made between SABS and Extended Aeration Activated Sludge System (EAASS). It is found that the wastewater was in a low strength and able to treated by biological process. SABS efficiently removed 40% to 60% of  $\text{PO}_4\text{-P}$ , 85 to 98% of COD, 60 to 90% of  $\text{BOD}_5$  and 90 to 98% of SS. The SABS also efficiently removed ammonia due to high increment of  $\text{NO}_3\text{-N}$  at the end of the process. Furthermore, SABS was efficiently complied with the new revised Malaysian effluent standard. The performance of SABS was effective during variation of incoming loading. By comparing with EAASS, SABS was more efficient and effective in treating domestic wastewater.

## DECLARATION BY THE CANDIDATE

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any academic institution or non-academic institution for any other degree or qualification.

In the event my thesis be found to violate the conditions mention above, I voluntarily waive the right of conferment of my degree and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

Wastewater in Malaysia not only consists of sewage but also water from bath, sink and other waste that people discharged into the sewers. In the year 2000, 45% of the total population of Malaysian has been provided with sewer connected services which conveyed the wastewater generated at various sources to the sewage treatment plant (Tan, 2008).

Since 1980's mechanized Sewage Treatment Plant (STP) has been widely used in Malaysia. These plants comprise preliminary treatment which removes solids, grit and grease, primary treatment and secondary treatment which include biological processes under aerobic or anaerobic conditions (Al-Shididi *et al.*, 2003). Table 1.1 shows the number of the public sewage treatment plants in Malaysia as well as the population equivalent for each type of STP. It shows that 69% is made up of mechanical plants, 13% imhoff tank, 11% network pump station and 7% oxidation pond (IWK, 2007). The mechanical STPs may include Conventional Activated Sludge System, Extended Aeration Activated Sludge System, Sequencing Batch Reactor, Intermittent Decanted Extended Aeration Activated Sludge System, Rotating Biological Contactors System and Bio-filter System.