CHARACTERIZATION OF MUNICIPAL SLUDGE USING OXYGEN UTILIZATION RATE (OUR) MODEL

By

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DECLARATION BY THE CANDIDATE

I Zurhaida binti Azlan, 2004677646, confirm that the work is my own and that appropriate credit has been given where reference has been made to the work of others.

(_____ 9th April 2007)

DECLARATION BY THE SUPERVISOR

I confirm that I have read and checked this report and in to my opinion the report is suitable in term of scope and quality required for awarding the Bachelor of Civil Engineering (Hons).

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ABSTRACT

Characterization of sludge is the first step in designing the process for sludge treatment. At present, the sludge characteristic in Malaysia is based on bulk parameters such as Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) that indicate the concentration of organic matter and the total amount of biodegradable organic matter respectively. Unfortunately, their relevance in explaining microbial process during treatment had been questioned. More focus is needed on the biomass present in the sludge as this is the active component directly influencing the biodegradation processes.

This proposal outlines an alternative method to characterise the municipal sludge by means of respirometric method. Characterization of sludge is done by evaluating the rate degradation of organic compound indirectly. This evaluation can be done by respirometry technique approach - based on its Oxygen Utilization Rate (OUR). At the end of this research, the sludge characterization will be in the form of COD-fractions, which includes the amount of the active biomass.

Keywords: COD-fractions, municipal sewage sludge, Oxygen Utilization Rate (OUR), respirometry techniques.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Prior to 1994, there were very limited facilities for handling sludge in Malaysia. It was either co-disposed with solid waste at landfill sites or disposed through shallow trenches. Municipal wastewater treatment in Malaysia had been privatised to Indah Water Konsortium (IWK) in April 1994 in order to upgrade the sewerage service. Since then, the sludge management, comprising, the collection, transportation, treatment and disposal of the sewage sludge has significantly improved. During the initial stage of privatization, the existing sewage treatment facilities like oxidation ponds and aerated lagoon were used for holding and treatment of sludge (Ujang *et al.*, 1999).

Abdullah and Baki (2006) reported that the total rate of sewage sludge generation in Malaysia is now estimated to be 6.5 million tons annually. The number is expected to increase in future. A study by Bradley and Dhanagunan (2003) reported that in year 2000, IWK collected only 360,000 m^3 sludge from three systems namely, sewage treatment plant, individual septic tank and pour-flush latrines. However, this represents only 10 percent of the total sludge generated.