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The Potential of Extended Aeration System for Sago Effluent Treatment

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Abstract: Problem statement: Sago effluent contains large amount of organic material which has a potential to cause water pollution. In order to reduce this problem, an experiment was conducted to remove organic material from sago effluent using lab scale of Extended Aeration (EA) system. **Approach:** The EA system consisted of the combination of physical and biological treatment unit. For Physical Treatment Unit (PTU), the sago effluent was filtered using 710 µm mesh size filter. For Biological Treatment Unit (BTU), the effluent were mixed and aerated with activated sago sludge for 48 h. The treatment efficiency with respect to Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Suspended Solid (TSS) removal were evaluated and compared with regulatory requirement by Department of Environment, Malaysia. **Results:** The result showed, the EA system could reduce BOD, COD and TSS up to 84, 87.8 and 73% respectively, however it did not comply with the regulatory requirement. **Conclusion:** This study suggested the EA system have potential to be apply on sago effluent, however it should be integrated with additional treatment unit to achieve the effluent quality standard.

Key words: Sago effluent, EA, BOD, COD, TSS

INTRODUCTION

EA system is a modified version of the activated sludge process whereby the effluent is maintained under long term Hydraulic Retention Time (HRT) and high concentration of Mixed Liquor Suspended Solid (MLSS). Under these conditions, the organism are starved and forced to degrade high organic substances in the effluent (Environmental Institute of Malaysia, 2007). This system has a potential to be apply on sago effluent treatment which contains high concentration of BOD, COD and TSS (Savitha *et al*., 2009; Chew and Shim, 1993).

Previous study by Bujang *et al*. (2005) reported that by removing the sago hampas from primary effluent could reduce TSS up to 70%. According to Environmental Institute of Malaysia (2007), the elimination of bulky waste from primary effluent could stabilize the effluent and increase the treatment efficiency. Meanwhile, Bujang *et al*. (2005) reported that the intermittent aeration of filtered sago effluent could increase the COD removal. According to Environmental Institute of Malaysia (2007) the treatment process using EA system is more effective under desirable MLSS.

The information and finding from those studies could be use to modify and improved the available EA system for sago effluent treatment. Therefore this study was conducted to evaluate the effectiveness of EA system for sago effluent treatment. In this study, the HRT was set within 48 h. Continuous aeration system were use and the effluent were mixed with sago activated sludge to increase the degradation process. The removal of BOD, COD and TSS were evaluate to determine the treatment efficiency.

MATERIALS AND METHODS

Primary sago effluent was collected from large sago mill (Nitsei Sago Industries Pte. Ltd) in Mukah Sarawak and were transported to the laboratory using 200 L PVC tank. The effluent then were filtered using

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