

**CURRENT RESEARCH
AND DEVELOPMENT IN
BIOTECHNOLOGY
ENGINEERING
AT IIUM**

VOLUME I

Editors:

Suleyman Aremu Muyibi
Mohammed Saedi Jami
Zaki Zainudin



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(VOLUME I)

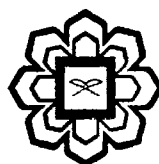
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**Department of Biotechnology Engineering
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CHAPTER 15

DESIGN OF TERTIARY TREATMENT SYSTEM FOR EFFLUENT FROM STP AT IIUM FOR HORTICULTURAL USES

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ABSTRACT

Tertiary treatment system is needed in processing the wastewater from existing STP effluent for reclamation purposes because it can remove contaminants better than existing secondary treatment system. HACH method was used to determine the TN, BOD₅, TP, TSS, zinc and copper as the parameters for the effluent wastewater quality both for selected STP3 in front of Mahallah Safiyyah at IIUM and designed tertiary treatment system. An anoxic denitrification/aerobic bio-oxidation process was designed using SuperPro Design software as the tertiary treatment system in order to meet the irrigation standard regulated by WHO. The resulted STP3 effluent quality for TP, TSS, zinc and copper were lower than the maximum allowable standard, therefore the simulation process only involved TN and BOD₅. It showed reduction of BOD₅ by about 85% and total nitrogen 86%; giving BOD₅ and total nitrogen 8 – 20 mg/L and 4 – 11 mg/L respectively thus meeting the WHO standard.

Keywords: tertiary treatment system, STP, reclamation, superPro design

INTRODUCTION

The releases of United Nations which predict a severe water shortage for about 2.7 billion people in the year 2025 urge many parties to develop and implement new water management strategies. Therefore, one of the major concerns of new water management strategies is the issue of treating and recycling wastewater for reuse which will play an important role in tackling the existing and occurring problems (Kretschmer et al. 2002). The needs for clean water increase due to population number, urbanization and industrialization. To enhance the volume of clean water, recycling of wastewater become the best option since raw water from rivers are open for pollution and contamination. Thus, wastewater treatment plants are needed parallel to the volume of population, so that the plants can provide safe water for the population uses.

Malaysia's 27million people generate about six million tons of sewage every year, most of which is treated and released into the rivers. Since about 98 percent of our fresh water supply comes from surface water, proper treatment of sewage must be ensured (Randall, 2008). Thus, the needs of wastewater reuse become vital as independent water source other