

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

Editors:

Md. Zahangir Alam
Ahmed Tariq Jameel
Azura Amid



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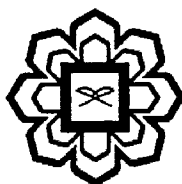
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**Department of Biotechnology Engineering
Faculty of Engineering
International Islamic University Malaysia**



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CHAPTER 34

TREATMENT OF PALM OIL MILL EFFLUENT USING MICROORGANISMS

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ABSTRACT

Palm oil mill effluent (POME) is produced in large volumes by many of the palm oil mills in Malaysia and poses a major source of pollution. POME contains large quantities of organic matter in the form of total solids that contribute to high biological oxygen demand (BOD) and chemical oxygen demand (COD) in wastewater if left untreated. A study was conducted to evaluate the potential use of *Trichoderma harzianum* and the mix culture of *Trichoderma harzianum* and *Penicillium* for the treatment of POME in reducing the pollutant. Using central composite design (CCD) experiment, each flask containing 100 ml POME is treated with an inoculums consisting of 3% inoculums containing 3×10^8 spores/ml and fermented in shake flask with pH 3,6,9 and the agitation speed; 50, 150, 250 rpm and incubated at 30°C for 5 days. Sample of the POME were analyzed at 24 intervals for BOD, COD and total suspended solids (TS). The result showed that the mix culture of *Trichoderma harzianum* and *Penicillium* gave better reduction of COD, and TSS with a value of 87.5% and 28.9%, respectively as compared to *Trichoderma harzianum* in which the value for reduction of COD and TSS is 85.2% and 27.2%, respectively at day 5 of the treatment.

Keywords: POME Treatment, *Trichoderma harzianum*, *Penicillium*, COD, TSS.

INTRODUCTION

Palm oil industry, apart from being a major producer and exporter of palm oil, is also identified as the single largest source of wastewater pollution (Omar et al., 2004). Large quantities of POME and palm waste are generated and discharged in the processing of palm oil fruit (Wahid, 2007; Omar *et al.*, 2004). The effluent must be treated to acceptable quality before it can be discharged into the watercourse for land application (Ahmad et al., 2003; Wahid, 2007). The treatment of POME usually involves cellulose degrading microorganisms (Shi, 2007). However, the biological processes for wastewater treatment consist of mixed communities with a wide spectrum of microorganisms, including bacteria, protozoa, fungi, rotifers, and possibly algae (Sethupathi, 2004). A typical characteristic of POME is shown in Table 1 where large quantities of BOD, COD and TSS are evident.