THE EFFECTIVENESS OF A FABRICATED BIO-FILTRATION SYSTEM IN TREATING THE DOMESTIC GREYWATER

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ABSTRACT

In many developing countries, domestic greywater remains as a large contributor of organic pollution in rivers. Considering rivers as the main source of freshwater, the level of pollution need to be minimized by pre-treating the domestic greywater from residential areas prior to release into the drains and rivers. With the need of this pre-treatment process and the economic burden to install current technologies, it is hence necessary to develop a more low-cost wastewater treatment system. Utilizing agriculture wastes as the bio-filter media in the greywater treatment system is one of the possible options to reduce the cost of treatment and accumulation of agricultural wastes. Therefore, this study focuses on the performance of agricultural wastes; coconut coir and rice husk, as low-cost packing media and biofilm material carrier for domestic greywater treatment. The performance of these media were evaluated based on the removal efficiencies of BOD_5 and COD from the wastewater samples. The results have shown that there were insignificant differences in the performance of both media in removing BOD_5 and COD, such that the removal efficiencies achieved by coconut coir media were 43.93% and 38.19% respectively, whilst the later recorded removal efficiencies of 42.42% and 34.85% respectively.

Key words: Greywater treatment, coconut coir, rice husk, packing media

INTRODUCTION

Sarawak River tributaries, situated in capital city of Sarawak, was significantly polluted and this is mainly due to the discharge of the untreated wastewater from the households into the open drains throughout the city (Ummi *et al.*, 2010). For instance, as reported by Ling *et al*. (2012), the water quality in the Semariang Batu River deteriorates due to the discharge of the domestic wastewater from the household septic tanks as well as kitchens and bathrooms. About 97% of water supply in Malaysia comes from rivers while the remaining are from sub-ground aquifers (Chan *et al*., 2014). Considering the significant role of river as the main source of freshwater, the river pollution needs to be minimized by treating the domestic wastewater, specifically the greywater from the residential areas prior to release into the drains and rivers.

The high cost of installation of many available treatment techniques to control the environment pollution can burden the society especially those from low-income families. Dubey and Sahu (2014) reported that the wastewater treatment is a major issue nowadays because treating the wastewater requires big cost in terms of equipment and chemicals used. For instance, fixed bed reactor is one of the best methods that is widely applied to treat the domestic greywater. However, the filters installed in the fixed bed reactor are polymer-fiber based filters which are relatively expensive.

Considering the need of domestic wastewater pre-treatment and the economic burden to install the current technology, it is hence necessary to develop a more cost-effective wastewater treatment system. According to El Nadi *et al.* (2014), one of the ways to mitigate environment pollution is by using agricultural waste as a bio-packing media to treat the domestic wastewater before it is discharged to any water bodies. Agricultural wastes are often considered to have no economic value and the accumulated amount of these waste can further cause environmental pollution. Utilizing agriculture waste as a bio-packing media for domestic greywater

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