

Thesis Title	An Anaerobic Fixed Film Reactor for the Treatment of Organic Substance and Dye from Textile Wastewater
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Abstract

This research aims to study the effectiveness of anaerobic fixed film reactor for the removal of organic substance and reactive dye from textile wastewater. A 0.5 L of laboratory-scale anaerobic fixed film reactors containing different media namely, granular activated carbon (GAC), rubber tyre and plastic were carried out. Simulated textile wastewater with glucose as carbon source (600 mg/l) together with 40 mg/l of reactive azo dye (C.I. Reactive Red 141) was semi-continuously fed to each reactor. The performances of each reactor were investigated at the hydraulic retention time (HRT) of 24, 12 and 6 h which correspondence to the organic loading of 0.94, 1.89 and 3.78 g COD/day, respectively.

Results revealed that the maximum COD removal efficiencies for reactor containing GAC, rubber tyre and plastic media were 75.25, 62.16 and 59.92 %, respectively, at the HRT of 12 h. The decolorization efficiencies were found to decreased as the HRT decreased. The decolorization efficiency was achieved over 80 % for GAC media at the shortest HRT of 6 h, whereas the 22 and 20 % were found in rubber tyre and plastic media, respectively. After 228 days of operation, the attached biomass on the media was determined quantitatively and qualitatively. Results from scanning electron microscope analysis showed that a roughness surface of GAC provided a good supporting of microbial attachment of which the biomass concentration 0.035 g MLSS/g GAC media. Meanwhile, the biomass concentrations from the surface of rubber tyre and plastic media were about a half of the GAC media. To investigate the effect of adsorption capacity of GAC in the reactor containing GAC media, the adsorption isotherm of biological activated carbon (BAC) and used GAC were analyzed and compared

with virgin GAC. It could be concluded that adsorption of reactive dye played an important role in the initial stage of operation and gradually decreased as time going on. The adsorption of reactive dye by BAC was very low and could be negligible. In addition, the adsorption of COD was low although the virgin GAC was used.

Keywords : Anaerobic Filter/ Biological Treatment/ Fixed Film/ Reactive Dye/ Textile Wastewater