



## Treatment of dyeing wastewater using submerged membrane bioreactor

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### ABSTRACT

This study was carried out to evaluate the efficiency of aerobic submerged hollow fiber membrane bioreactor (HFMBR) in the removal of direct fast red dye-CI 81 from textile wastewater. The effect of hydraulic retention time (HRT), initial dye concentration, and transmembrane pressure (TMP) on the performance of submerged HFMBR was studied. The removal rate of chemical oxygen demand was found to increase with the increasing of HRT and decrease with increasing initial dye concentration and TMP. The rate of dye removal was found to increase with increasing HRT and decrease with the increasing TMP. The optimum color removal was obtained at initial dye concentration of 150–200 ppm. A mass transfer model for the dye removal using submerged membrane bioreactor system was developed and verified. The results revealed that there is a remarkable agreement between the theoretical results and experimental results with a deviation of 14.83%. The membrane fouling was investigated using electron dispersive X-ray (EDX) and scanning electron microscope (SEM) and compared with the EDX and SEM of the original one. SEM images revealed that there are some geometrical changes that occur in the membrane pores with fouling, while EDX mapping showed that most of the foulants deposited on the inner surface of the fiber.

*Keywords:* MBR; Membrane fouling; Microfiltration; Mass transfer; Modeling

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