

Removal of Diamozol Red ED-3 from simulated textile wastewater in Membrane Bioreactor (MBR) System.

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Abstract- The reuse of wastewater reduces both the consumption of freshwater resources and minimizes the environmental impact of discharged wastewater. Biological treatment technologies have been utilized in wastewater reclamation for over a century. Membrane Bioreactors (MBRs) can be broadly defined as systems integrating biological degradation of waste products with membrane filtration. Membrane bioreactors are composed of two primary parts, the biological unit responsible for the biodegradation of the waste compounds and the membrane module for the physical separation of the treated water from mixed liquor. They have proven quite effective in removing organic and inorganic contaminants as well as biological entities from wastewater. Membrane bioreactor technology has great potential in a wide range of applications including textile wastewater treatment.

In this research, the decolourization process of Diamozol Red ED-3 textile dye by using activated sludge collected from wastewater treatment facility in Bilecik First Organized Industry Zone was examined in membrane bioreactor (MBR) system. The Lab/Pilot Scale MBR system had a working volume of 170 L and was equipped with a coarse and fine air bubble creation mechanism for membrane and biological aeration, respectively. The temperature of the aeration tank was controlled at $25 \pm 1^\circ\text{C}$, the pH value and the concentration of DO was kept, respectively, in the range of 6,5-7,0 and 2,0-2,5 mg/L in the aeration tank. The initial dye concentration and COD concentration of the synthetic wastewater prepared for decolourisation process were 50 and 952 mg/L, respectively. The dye concentration, COD concentration value were measured daily in effluent to assess the removal efficiency. Most of the analytical techniques used in this study were mentioned in the standard methods. At the end of the study treatment percentage colour removal was approximately %76 and COD removal was %80 in 7 days. The results obtained from this study showed that textile dyes can be effectively decolorized by the activated sludge in MBR system.

Keywords- Biodegradation, COD, Decolourisation, MBR, Textile wastewater.