

Biodegradation of azo dye remazol black 5 by mono culture bacteria with tempe industrial wastewater as co-substrate

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Abstrak

Azo dye is one of the synthetic organic dye groups most widely used in the textile industry. The release of this component into the environment can be harmful to the living organisms and the ecosystems. Therefore, it is necessary to treat wastewater containing dye before it is discharged into the water bodies. The decolorization using mono- or mixed culture has been developed for decades because of its environmental friendly and evidence of completely mineralization. Sixteen species of pure culture bacteria derived from aerobic-anoxic membrane bioreactor were used for biodegradation of azo dye Remazol Black 5 using tempe industrial wastewater as co-substrate. The optimum co-substrate concentration for biomass growth under shaking condition was 40% v/v or 2,560-2,720 mg COD/L, while dye decolorization under this condition was not significant. The azo dye biodegradation in anaerobic condition was best shown by the Isolate A1A, *Exiguobacterium* sp. A2, and *Bacillus* sp. A4 with removal efficiency of 43.82%, 29.94% and 35.91% respectively. The highest color degrading bacteria were also the highest organics removing bacteria. It was confirmed that dye decolorization process required a carbon source addition.