ABSTRACT

PHOTOCATALYTIC DEGRADATION KINETICS OF AZOIC DYES IN THE BATIK INDUSTRY WASTEWATER USING TiO$_2$ CATALYST

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Catalytic photo-oxidation of azoic dyes in the batik industry wastewater has been done on this research. This study aimed to determine azoic dyes degradation kinetics including reaction rate, order and reaction rate constant of photocatalytic oxidation using TiO$_2$ semiconductor catalyst. In addition, the maximum condition of azoic dyes photocatalytic degradation in the batik industry wastewater also needs to know. Variations of H$_2$O$_2$ as an oxidizing agent used was 3 mL (0.1%), 6 mL (0.2%), 9 mL (0.3%), 12 mL (0.4%) and 15 mL (0.5%) in a mixture of 1000 mL dyes wastewater. The results of the analysis showed that the photocatalytic degradation of azoic dyes occurred at the pseudo-first order reaction with the rate constants increasing due to higher H$_2$O$_2$ concentration. The maximum condition of azoic dyes photocatalytic degradation in the batik industry wastewater is achieved using 0.5% H$_2$O$_2$ within 2 hours (120 minutes). Moreover, it is known that the higher concentration of H$_2$O$_2$ is used, the more maximum of azoic dyes photocatalytic degradation.

Keywords: Azoic dyes, photocatalytic degradation, order reaction, reaction rate constant